SHARP SERVICE MANUAL

No. S2208IMMT899H

PORTABLE MINIDISC RECORDER

MODEL IM-MT899H(S) IM-MT899W(S)

NetMD OpenMG

MiniDisc MDLP gracenote cddb

- In the interests of user-safety the set should be restored to its original condition and only parts identical to those specified be used.

CONTENTS

	Page
SAFETY PRECAUTION FOR SERVICE MANUAL	2
SPECIFICATIONS	3
NAMES OF PARTS	5
OPERATION MANUAL	6
DISASSEMBLY	10
REMOVING AND REINSTALLING THE MAIN PARTS	11
ADJUSTMENT	12
NOTES ON SCHEMATIC DIAGRAM	28
TYPES OF TRANSISTOR AND DIODE	28
BLOCK DIAGRAM	29
SCHEMATIC DIAGRAM	30
WIRING SIDE OF P.W.BOARD	32
VOLTAGE	36
WAVEFORMS OF MD CIRCUIT	38
WAVEFORMS POINTS	39
TROUBLESHOOTING	40
TROUBLESHOOTING FOR NET MD	43
PROCEDURES FOR CONNECTION TO A NET MD PLAYER	44
FUNCTION TABLE OF IC	45
PARTS GUIDE/EXPLODED VIEW	
PACKING METHOD (FOR U.K. ONLY)	

SHARP CORPORATION

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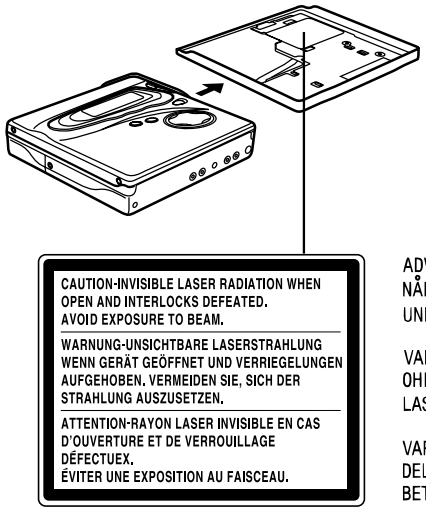
The contents are subject to change without notice.

SAFETY PRECAUTION FOR SERVICE MANUAL

Precaution to be taken when replacing and servicing the Laser Pickup.

The AEL (Accessible Emission Level) of Laser Power Output for this model is specified to be lower than Class I Requirements. However, the following precautions must be observed during servicing to protect your eyes against exposure to the laser beam.

(1) When the cabinet has been removed, the power is turned on without a compact disc, and the Pickup is on a position outer than the lead-in position, the Laser will light for several seconds to detect a disc. Do not look into the Pickup Lens.
(2) The Laser Power Output of the Pickup inside the unit and replacement service parts have already been adjusted prior to shipping.
(3) No adjustment to the Laser Power should be attempted when replacing or servicing the Pickup.
(4) Under no circumstances look directly into the Pickup Lens at any time.
(5) CAUTION - Use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.


CAUTION-INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.
WARNUNG-UNSICHTBARE LASERSTRAHLUNG WENN GERÄT GEÖFFNET UND VERRIEGELUNGEN AUFGEHOBEN. VERMEIDEN SIE, SICH DER STRAHLUNG AUSZUSETZEN.
ATTENTION-RAYON LASER INVISIBLE EN CAS D'OUVERTURE ET DE VERROUILLAGE DÉFECTUEX. ÉVITER UNE EXPOSITION AU FAISCEAU.

ADVARSEL-USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

VARO! AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖN LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEN.

VARNING-OSYNLIG LASERSTRÅLING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.

Laser Diode Properties
- Material: GaAlAs
- Wavelength: 785 nm
- Pulse time:
  Read mode: 0.8 mW Continuous
  Write mode: max 10 mW 0.5S
  min cycle 1.5S
  Repetition

Precaution to be taken when replacing and servicing the laser pickup.
The following precautions must be observed during servicing to protect your eyes against exposure to the laser.

Warning of possible eye damage when repairing:
If the AC adaptor or batteries are connected when the top housing (disc cover) of the unit is removed, and the PLAY key is pressed, the laser will light up during focus access (2-3 seconds). (Fig. 2-1) During the operation, the laser will leak from the opening between the magnetic head and the mechanical chassis (Fig. 2-2). In order to protect your eyes, you must not look at the laser during repair. Before repairing be sure to disconnect the AC adaptor and remove the batteries.

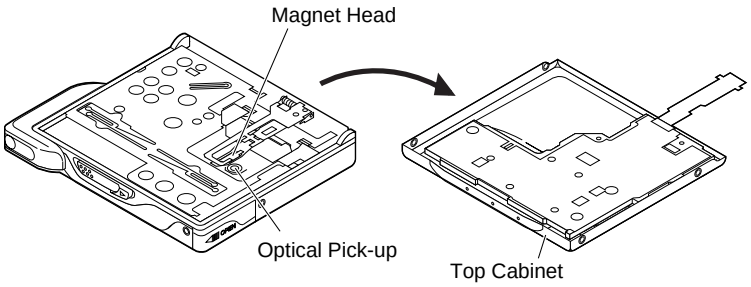


Figure 2-1

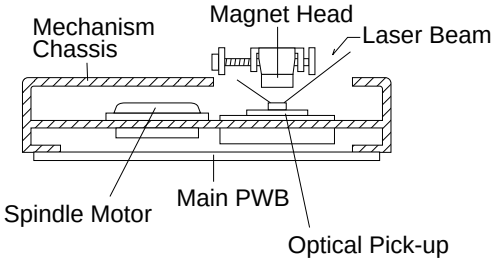


Figure 2-2

FOR A COMPLETE DESCRIPTION OF THE OPERATION OF THIS UNIT, PLEASE REFER TO THE OPERATION MANUAL.

SPECIFICATIONS

IM-MT899H

Power source:
DC 5 V: AC adaptor (AC 230 V, 50/60 Hz)
DC 1.5 V: Commercially available, "AA" size (LR6), alkaline battery x 1
DC 1.2 V: Rechargeable Nickel-Metal Hydride battery AD-N55BT x 1
DC 1.5 V: Optional car adaptor, AD-CA55X (for cars with a 12 - 24 V DC negative earth electrical system)

Power consumption: 7 W (AC adaptor)

Output power: RMS: 10 mW (5 mW + 5 mW)
(0.2 % T.H.D.)

Charging time: Approx. 3.0 hours (90 %)
Approx. 5.0 hours (fully charged)

Dimensions: Width: 78.9 mm (3-1/8") Height: 15.7 mm (5/8") Depth: 71.9 mm (2-27/32")
Excluding the projection around the USB connection terminal

Weight: 130 g (0.29 lbs.) with rechargeable battery

Input socket: Line/optical digital, microphone (powered by the main unit)
Available USB port

Output socket: Earphones (impedance: 32 ohms)/remote control unit

Type: Portable MiniDisc recorder

Signal readout: Non-contact, 3-beam semiconductor laser pickup

Audio channels: Stereo 2 channels/monaural 1 channel

Frequency response: 20 - 20,000 Hz (±3 dB)

Rotation speed: Approx. 400 - 1,350 rpm

Error correction: ACIRC (Advanced Cross Interleave Reed-Solomon Code)

Coding: ATRAC/ATRAC3 (Adaptive TRansform Acoustic Coding), 24-bit computed type

Recording method: Magnetic modulation overwrite method

Sampling frequency: 44.1 kHz (32 kHz and 48 kHz signals are converted to 44.1 kHz, and then recorded.)

Wow and flutter: Unmeasurable (less than ± 0.001 % W. peak)

Battery life:

	Stereo		2 times long		4 times long	
When using the rechargeable battery (fully charged) included with the unit	Continuous recording: Approx. 6 hours	Continuous play: Approx. 9.5 hours	Continuous recording: Approx. 8.5 hours	Continuous play: Approx. 11 hours	Continuous recording: Approx. 10 hours	Continuous play: Approx. 12.5 hours
When using one, commercially available, high capacity, "AA" size (LR6), alkaline battery (The rechargeable battery is in the unit, discharged.)	Continuous recording: Approx. 6 hours	Continuous play: Approx. 14 hours	Continuous recording: Approx. 9.5 hours	Continuous play: Approx. 17.5 hours	Continuous recording: Approx. 12.5 hours	Continuous play: Approx. 19.5 hours
When using one, commercially available, high capacity, "AA" size (LR6), alkaline battery with the rechargeable battery (fully charged)	Continuous recording: Approx. 14.5 hours	Continuous play: Approx. 24 hours	Continuous recording: Approx. 20.5 hours	Continuous play: Approx. 29.5 hours	Continuous recording: Approx. 26 hours	Continuous play: Approx. 33 hours

Input sensitivity:

	Reference input level	Input impedance
MIC H	0.25 mV	10 k ohms
MIC L	2.5 mV	10 k ohms
LINE	100 mV	20 k ohms

Output level:

	Specified output	Maximum output level	Load impedance
Earphones	-	5 mW + 5 mW	32 ohms
LINE	250 mV (-12 dB)	-	10 k ohms

- The continuous recording time is for analogue inputs when the volume level is set to "VOL 0".
- The continuous play time shows the value when the volume level is set to "VOL 15".
- The above values are the standard values when the unit is charged and used at an ambient temperature of 25°C (77°F).
- The operating time when using an alkaline battery may be different, depending on the type and manufacturer of the battery, and on the operating temperature.
- The L(LIGHT) is set at "O(OFF)".

Specifications for this model are subject to change without prior notice

IM-MT899W

Power source:
DC 5 V: AC adaptor (AC 110 - 240 V, 50/60 Hz)
DC 1.5 V: Commercially available, "AA" size (LR6), alkaline battery x 1
DC 1.2 V: Rechargeable Nickel-Metal Hydride battery AD-N55BT x 1
DC 1.5 V: Optional car adaptor, AD-CA55X (for cars with a 12 - 24 V DC negative earth electrical system)

Power consumption: 0.15 A (AC adaptor)

Output power: RMS: 10 mW (5 mW + 5 mW)
(0.2 % T.H.D.)

Charging time: Approx. 3.0 hours (90 %)
Approx. 5.0 hours (fully charged)

Dimensions: Width: 78.9 mm (3-1/8") Height: 15.7 mm (5/8") Depth: 71.9 mm (2-27/32")
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LINE	100 mV	20 k ohms

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LINE	250 mV (-12 dB)	-	10 k ohms

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- The continuous play time shows the value when the volume level is set to "VOL 15".
- The above values are the standard values when the unit is charged and used at an ambient temperature of 25°C (77°F).
- The operating time when using an alkaline battery may be different, depending on the type and manufacturer of the battery, and on the operating temperature.
- The L(LIGHT) is set at "O(OFF)".

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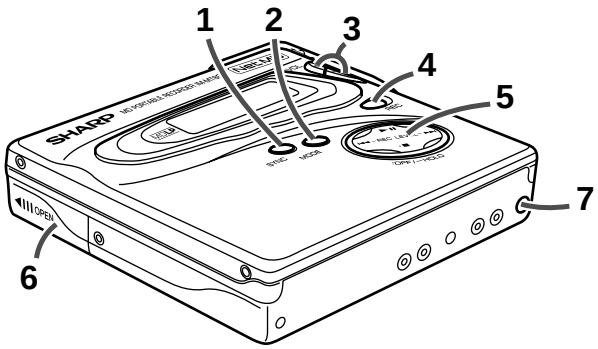
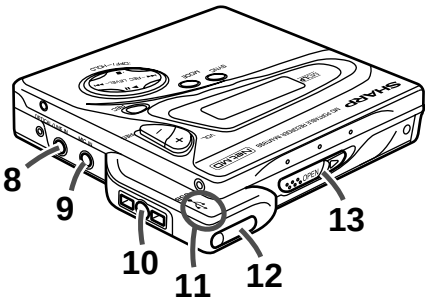
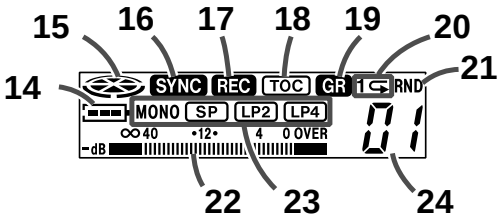
NAMES OF PARTS

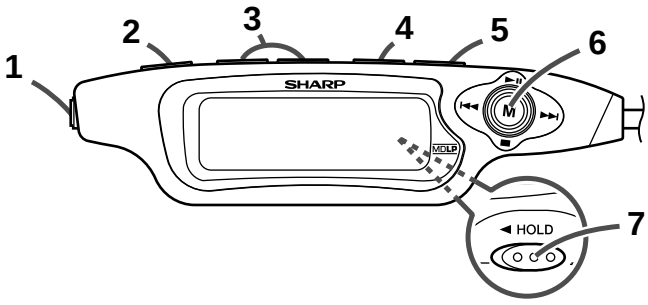


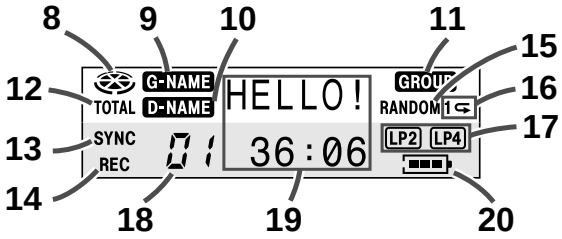




■ Main unit

1. Synchronised Recording Button
2. Mode Button
3. Volume Buttons
4. Record Button
5. Play/Pause/Stop/Power Off/Hold/Fast Forward/ Fast Reverse Button
6. Rechargeable Battery Cover
7. 2 V DC Input Socket
8. Optical/Line Input Socket
9. Microphone Input Socket
10. Remote Control/Earphones/ Line Output Socket
11. 7-Colour Indicators
12. USB Socket
13. Open Lever
14. Battery Indicator
15. Disc Mode Indicator
16. Synchro Recording Indicator
17. Record Indicator
18. TOC Indicator
19. Group Indicator
20. Repeat Indicator
21. Random Indicator
22. Level Meter
23. Recording Mode Indicators
24. Track Number Indicator

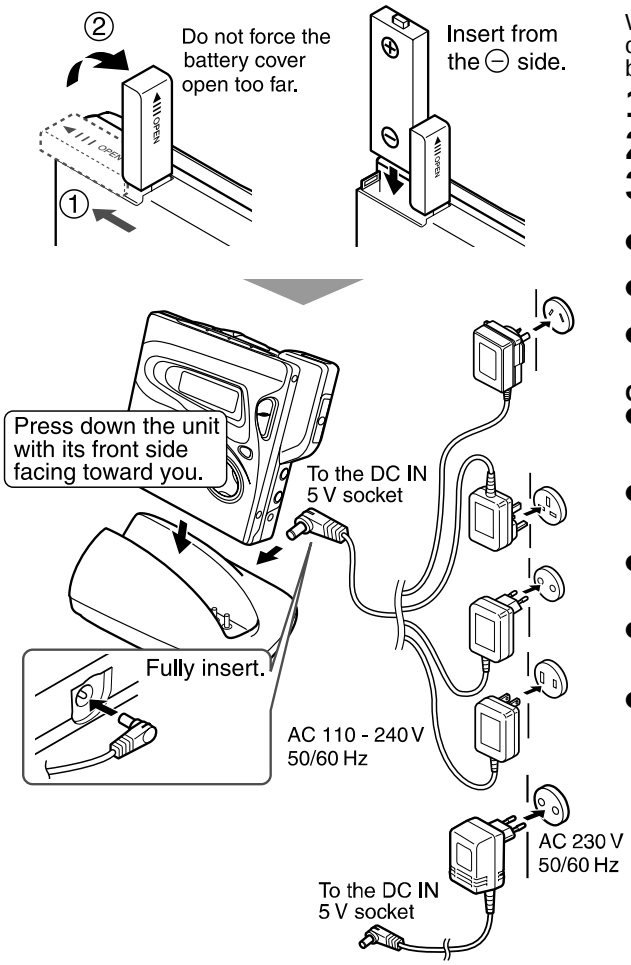




■ Remote control unit

1. Earphones Socket
2. Record Button
3. Volume Buttons
4. Mode/Display Button
5. Group/Clear Button
6. Menu Button
7. Hold Switch
8. Disc Mode Indicator
9. Group Name Indicator
10. Disc Name Indicator
11. Group Indicator
12. Total Track Number Indicator
13. Synchro Recording Indicator
14. Record Indicator
15. Random Indicator
16. Repeat Indicator
17. Recording Mode Indicators
18. Track Number Indicator
19. Character/Time Information Indicator
20. Battery Indicator

Using with the Rechargeable Battery


②
Do not force the battery cover open too far.
①
Insert from the ⊖ side.
Press down the unit with its front side facing toward you.
To the DC IN 5 V socket
Fully insert.
AC 110 - 240 V 50/60 Hz
AC 230 V 50/60 Hz
To the DC IN 5 V socket

■ Charging

When the rechargeable battery is used for the first time or when you want to use it after a long period of disuse, be sure to charge it fully.

1 Insert the rechargeable battery.

2 Connect the AC adaptor.

3 Place the unit on the battery charger.

- When the portable MD is turned on or operating, the battery will not be charged.
- No operation can be performed whilst charging. If you try to operate, "CH" will appear.
- After the rechargeable battery is charged or used, it will get slightly warm. This is normal.

Caution:

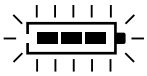
- Use the specified battery AD-N55BT only. Do not charge a battery (nickel-cadmium, alkaline, etc.) other than that specified.
- Do not remove the outer cover of the rechargeable battery. It may cause heat generation, fire, or explosion.

- Do not dip the battery in water, do not dispose of it in a fire, and do not take it apart.
- If the rechargeable battery terminal is dirty, charging may not start. In such a case, wipe off the dirt with a dry cloth.
- Do not disassemble the battery.

Using with the Rechargeable Battery

■ Display of remaining amount of battery

When the unit is set on the charger, the remaining amount of battery is displayed.

Display	Conditions
Scroll	**Charging.**
Turned off	**Charging completed.** When the unit is not set correctly on the charger, the rechargeable terminal is dirty, or foreign material adheres to it, charging may not be possible. (Wipe the terminal with dry cotton swab.)
 Flashing	**Refreshing.** The unit automatically discharges the battery that has been charged repeatedly. After refreshing, it starts charging automatically.

■ Charging time

Charging is completed in about 3 hours, and the display of remaining amount of battery will go out.
90 % of charging is completed. If you leave it for another 2 hours, the battery will be fully charged.

- Charge the battery within the range of 5°C - 35°C (41°F - 95°F).
- The unit can be left in the charging state after it is completed.

Refresh

If you charge the battery before it runs out completely, the operating time may be shortened. To avoid this, the battery is discharged automatically and refreshed.

MiniDisc System Limitations

The unit may have the following symptoms whilst recording or editing. The unit is not out of order.

SYMPTOM	LIMITATIONS
"D-FULL" or "T-FULL" appears even though the MiniDisc still has recording time left.	More than the limited number of tracks (255) cannot be recorded regardless of the recording time. If the MiniDisc is recorded or edited repeatedly or it has scratches (recording skips scratched parts), you may not be able to record the maximum number of tracks described above. If the total number of character information (disc, group, and track names) exceeds 1,700, the MD cannot be edited.
The remaining recording time does not increase even though you erased tracks.	The unit does not count non-recorded portions that last 12 or fewer seconds to display the remaining recording time. The time may not increase even if you erase short tracks.
The total of the recorded time and the remaining time does not match the maximum recordable time.	One cluster (approximately 2 seconds) is the minimum unit for recording. For example, a 3-second track uses 2 clusters (approximately 4 seconds). Therefore, the actual recordable time may be shorter than the displayed time. (The number of seconds indicates that in the stereo recording mode (SP). It varies depending on the recording mode.)
Combine function does not work.	A MiniDisc on which recording and editing are repeated may not allow the combine function.
Sound skips in fast reverse/forward.	If one track is divided and recorded in separate places on a repeatedly recorded or edited MiniDisc, sound may skip.
A track number is created in the middle of a track.	A track number may be created if there are scratches or dust on the MiniDisc.
Even if "LP :" is entered at the top of the name, "LP :" is not displayed.	If "LP :" is entered at the top of the 2 times/4 times long recorded track (LP2/LP4), "LP :" will not be displayed. Enter other symbols than ":" after "LP".

Troubleshooting

Many potential "problems" can be resolved by the owner without calling a service technician. If something seems to be wrong with this product, check the following before calling your authorised SHARP dealer or service centre.

The unit does not turn on.
- Is the AC adaptor disconnected?
- Is the battery exhausted?
- Is the unit in the hold mode?
- Has condensation formed inside the unit?
- Is the unit being influenced by mechanical shock or by static electricity?

No sound is heard from the earphones.
- Is the volume set too low?
- Is the remote control unit or the earphones plugged in?
- Are you trying to play a MiniDisc with data on it instead of a MiniDisc containing music?

When the operation buttons are pressed, the unit does not respond.
- Is the unit in the hold mode?
- Is the battery being charged?
- Is the battery exhausted?
- Is the remote control unit plug or the earphones plug inserted firmly?

Some sounds are skipped.
- Is the battery exhausted?
- Is the unit being subjected to excessive vibration?

The MiniDisc cannot be ejected.
- Has the track number or character information been written on the disc yet?
- Is the unit in the recording or editing mode?

Recording and editing are impossible.
- Is the MiniDisc protected against accidental erasure?
- Has the recording level been properly adjusted?
- Is the unit connected properly to the other equipment?
- Is the AC adaptor unplugged or did a power failure occur whilst recording or editing?
- Is the unit in the hold mode?
- Is an optical signal being output from the stereo system? Read the operation manual for the stereo system.

The battery cannot be charged.
- Is the rechargeable battery in the unit?
- Is the terminal dirty?

Group functions cannot be used with the group-recorded MD.
- TOC information may have been changed with other equipment.

Troubleshooting (continued)

■ If trouble occurs

When this product is subjected to strong external interference (mechanical shock, excessive static electricity, abnormal supply voltage due to lightning, etc.) or if it is operated incorrectly, it may malfunction.

If such a problem occurs, do the following:

1. Unplug the AC adaptor from the wall socket.
2. Remove the battery.
3. Leave the unit completely unpowered for approximately 30 seconds.
4. Plug the AC adaptor back into the wall socket and re-operate the unit.

■ Moisture condensation

When the unit has condensation inside, the disc signals cannot be read, and the unit may not function properly.

In the following cases, condensation may form inside the unit.
- Shortly after turning on a heater.
- When the unit is placed in a room where there is excessive steam or moisture.
- When the unit is moved from a cool place to a warm place.

To remove condensation:

Remove the MiniDisc and leave the unit for approximately 1 hour. The condensation should evaporate and the unit will work properly.

Error Messages

ERROR MESSAGES	MEANING
BLANK	● Nothing is recorded. (Replace the disc with a recorded disc.)
busy	● A track is being moved.
Can'tC	● You tried to record from a copy prohibited MiniDisc. ● You tried to record signals other than music (such as data). (Record using the analogue cable.)
Can'tE	● A track cannot be edited. (Change the stop position of the track and then edit it.)
Can'tL	● You tried to record or edit the MD whilst operating the OPEN lever.
Can'tP	● Cannot play the MD.
Can'tR	Recording cannot be performed correctly due to vibration or shock.
Can'tS **Can'tT(*)** **Can'tU**	● The disc data cannot be read because the disc is damaged. (Reload the Minidisc or replace it with another one.)
Can'tSTAMP	● Stamp function does not work. (Check the number of tracks.)

Number or symbol appears in (*) position.

ERROR MESSAGES	MEANING
Can'tW	● Cannot save the TOC information correctly to a MiniDisc.
CH (displayed on the main unit)	● You tried to operate whilst charging.
D-FULL	● The disc is out of recording space.
DEFECT	● The disc is scratched. (If the recorded sound is not right, retry recording or replace the disc with a recordable one.)
Er-MD (**)	● The microprocessor has reported a system fault and the unit is out of order. (To have it repaired, go to the distributor where you purchased the unit.)
G-FULL	● The total number of groups exceeds 99. (Erase unnecessary groups.)
HOLD	● The unit is in the hold mode.
LoBATT	● The rechargeable or alkaline battery has run down.
LOCKED	● You removed a MiniDisc whilst recording or editing. (Turn off the power before removing the MiniDisc.)

Error Messages

ERROR MESSAGES	MEANING
N-FULL	● The number of a disc, group, or track name exceeds 40. (Shorten the name.)
NoDISC	● A disc has not been loaded.
noSIG	● Poor connection of the digital cable. ● No output signal comes out from the connected unit to playback. (Use the AC power for the connected unit.) ● The input signal has improper sampling frequency.
NoTRACK	● There is no track to be played.
PLAYmd	● You tried to record on a playback-only disc.
POWER ?	● The battery charger is defective.
PROTECTED	● The write protection tab of a MiniDisc is set to the protected position.
Sorry	● Since a track number is currently being located or updated, the unit cannot accept your command. (Wait for a while and try the operation again.)
T Form (*)	● There is an error in the recording signal. (Erase all of the tracks, and then record again.)

Number or symbol appears in (*) position.

ERROR MESSAGES	MEANING
T-FULL	● There is no space left for recording character information (track names, disc names, etc.).
TEMP!	● The temperature is too high. (Turn off the power, and wait for a while.)
Tr. Protect	● The track has been protected from being erased. (Edit the track with the device on which it was recorded.)
?DISC	● A disc which contains data other than music was played. (A disc which contains nonmusic data cannot be played.)
?GrForm	● The group recording or the GROUP RESERVE function cannot be performed. (Erase the disc name and retry the same operation.)

If the operation is not accepted, "--" may be displayed on the main unit. For details, refer to the display on the remote control.

DISASSEMBLY

Cares before disassembling

When assembling the machine after disassembling or repair, observe the following requirements so as to ensure safety and performance.

1. Remove the batteries from the machine, and take out the mini-disc.
2. When assembling after repair, be sure to position the wires in the same location.
   Use the specified screws to fix the cabinet and the mechanism unit. The use of the screws with length other than specified may cause contact with the mechanism unit resulting in malfunction.
3. When repairing, pay close attention so not to damage the IC from static electricity.

STEP	REMOVAL	PROCEDURE	FIGURE
1	Bottom Cabinet	1. Screw ..... (A1) x6	10-1
2	Top Cabinet	1. Open the Top cabinet. 2. Screw ..... (B1) x4 3. Flexible PWB ..... (B2) x1	10-1 10-2
3	Main PWB	1. Open the rechargeable battery compartment of the direction indicated by arrows. 2. Screw ..... (C1) x2 3. Flexible PWB ..... (C2) x2	10-2
4	MD Mechanism	1. Remove the center cabinet in the direction indicated by the arrow. 2. Screw ..... (D1) x1	10-3
5	LCD/KEY PWB	1. Screw ..... (E1) x2 2. Hook ..... (E2) x2	10-4

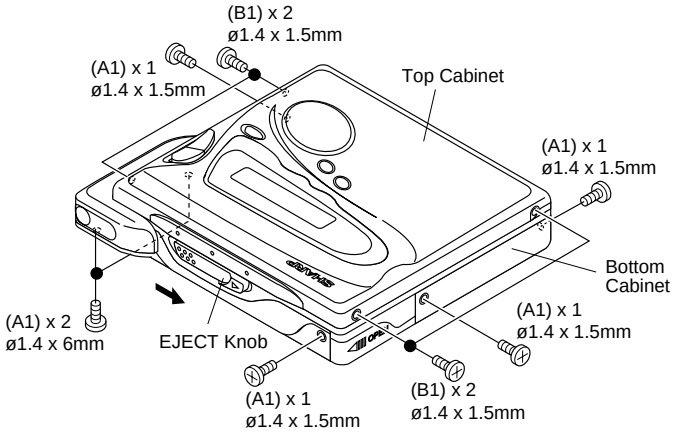
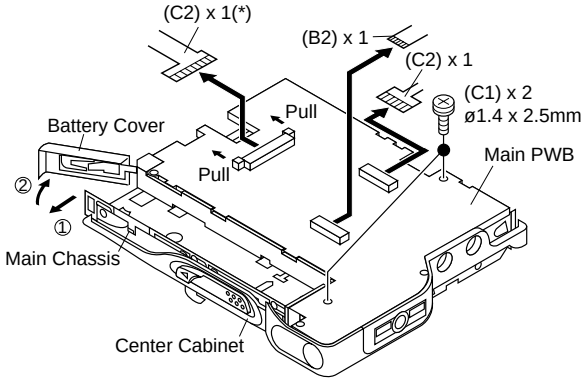


Figure 10-1



Caution:

Carefully handle the main PWB and flexible PWB. After removing the flexible PWB (*) for the optical pickup from the connector, do not touch directly the front end of flexible PWB with your hand so as to prevent damage of optical pickup by static electricity.

Figure 10-2

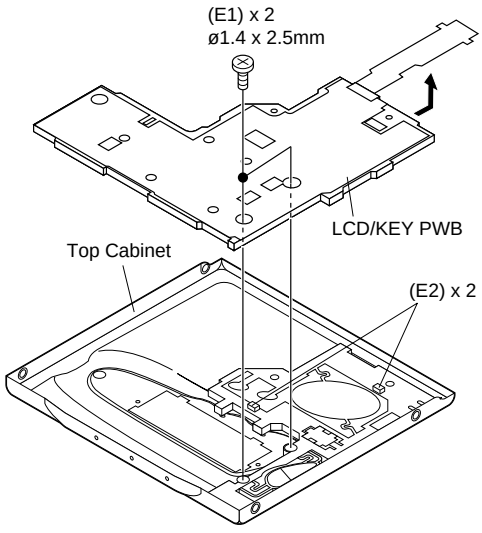


Figure 10-4

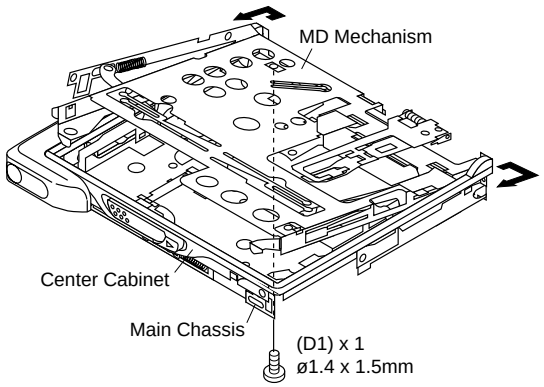


Figure 10-3

REMOVING AND REINSTALLING THE MAIN PARTS

Remove the MD mechanism according to the disassembling methods 1 to 4. (See Page 10.)

How to remove the spindle motor (See Fig. 11-1.)

1. Remove the solder joints (A1) x 4 of flexible PWB.
2. Remove the screws (A2) x 3 pcs., and remove the spindle motor.

How to remove the lift motor (See Fig. 11-2.)

1. Remove the solder joints (B1) x 2 of lift motor lead wire.
2. Remove the screw (B2) x 1 pc., and remove the lift motor.

Note:
Take care so that the motor gear is not damaged.
(If the gear is damaged, noise is caused.)

How to remove the sled motor (See Fig. 11-3.)

1. Remove the stop washer (C1) x 1 pc., and remove the drive gear (C2) x 1 pc.
2. Remove the screws (C3) x 2 pcs.
3. Remove the solder joints (C4) x 3 of flexible PWB., and remove the sled motor.

Note:
Take care so that the motor gear is not damaged.
(If the gear is damaged, noise is caused.)

How to remove the magnetic head ass'y (See Fig. 11-4.)

1. Remove the screws (D1) x 2 pcs. of the magnetic head ass'y and the optical pickup, and remove the solder joints (D2) x 2 of the head flexible plate.

Note:
Mount carefully so as not to damage the magnetic head.

How to reinstall the optical pickup (See Fig. 11-4.)

1. Remove the screw (E1) x 1 pc., and remove the grip spring.
2. Remove the screw (E2) x 1 pc. to remove the thrust spring, and remove the drive screw and the optical pickup from MD mechanism.
   Then, remove the drive screw from the optical pickup.

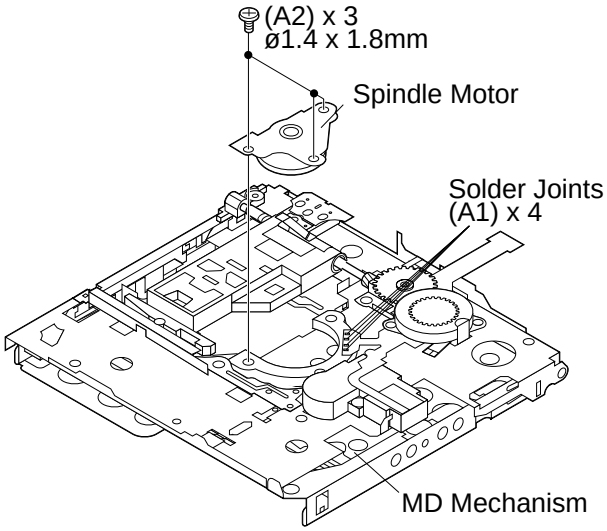


Figure 11-1

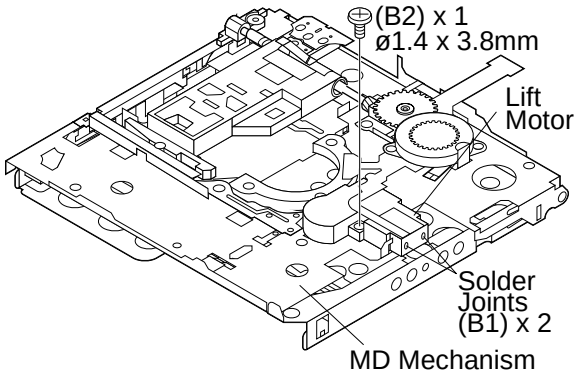


Figure 11-2

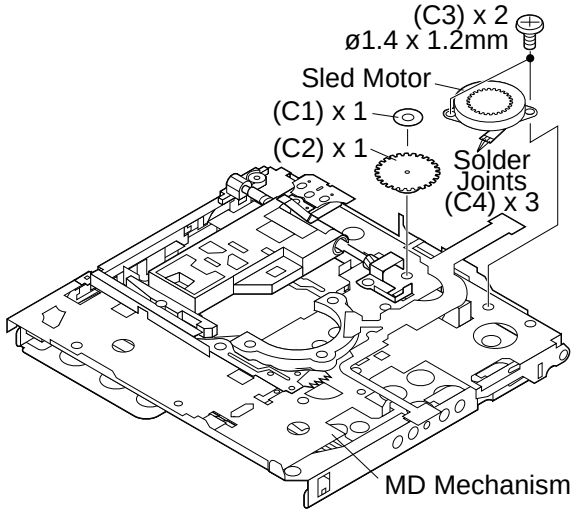


Figure 11-3

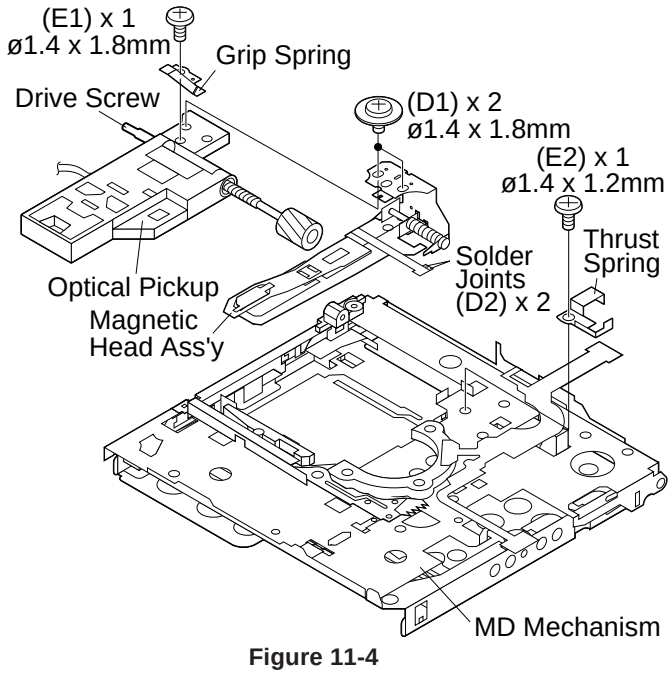


Figure 11-4

ADJUSTMENT

● Test disc

MD adjustment needs two types of disc, namely recording disc (low reflection disc) and playback-only disc (high reflection disc).

	Type	Test disc	Parts No.
1	High reflection disc	MMD-110 (TEAC Test MD)	88GMMD-110
2	Low reflection disc	MMD-213A (TEAC Test MD)	88GMMD-213A
3	Low reflection disc	Recording mini disc	UDSKM0001AFZZ
4	Extension cable	For operational inspection (extension cable for motors)	QCNWN6936AFZZ
5	Extension relay PWB	For operational inspection (extension relay PWB for motors)	RUNTK0613AFZZ

Note: Use the low reflection disc on which music has been recorded.

● Entering the TEST mode

1. Setting via port (when no disc is loaded, or the unit is in the stand-by mode or turned off)

(1) Set the port as follows.
TEST0 : "Low"
(2) Press the PLAY button in the stand-by mode. (You can also insert a disc or turn on the unit.)
(3) Test Mode STOP. [T E S T _]

2. Setting by using special buttons (in the stand-by mode)

Test mode : Perform it with the remote control.
(1) Press the "PLAY" button while holding down the "MODE/DISPLAY" button.
(2) Release the "MODE/DISPLAY" button.
(3) Press the "VOLUME–" button while holding down the "PLAY" button.
(4) Initialize the normal mode settings (BASS setting, VOLUME setting, etc.).
(5) Test Mode STOP. [T E S T _]
(6) To check the version of the microcomputer, press the VOLUEM +.
(The version will be displayed on the remote control, but not on the main unit.)
(7) Press the "VOLUME–" to light up the LCDs.

● Leaving the TEST mode

(1) Press the STOP button when TEST appears.

● Shipping setting method

(1) Insert the rechargeable battery. Do not close the battery lid.
(2) Close the lid while holding down the VOLUME– and PLAY button on the main unit simultaneously.
(3) When “Inl” appears, check that the LCD is lit.

● Test Mode

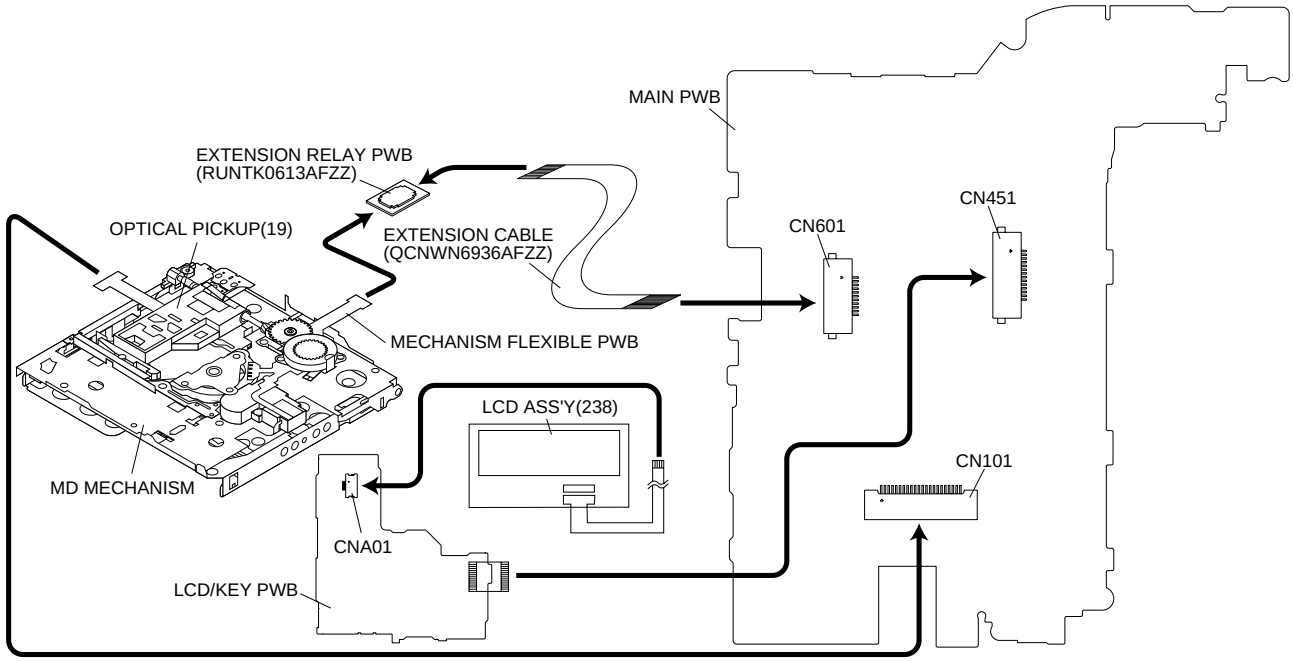


Figure 12

1. AUTO 1 Mode	• Perform preliminary automatic adjustment. • If the combination of the mechanism and pickup PWB is changed, be sure to start adjustment in this mode.
2. AUTO 2 Mode	• Perform ATT (attenuator) automatic adjustment. • Perform continuous playback (error rate display, jump test).
3. MANUAL 1 Mode	• Display the temperature. • Check the displayed value and perform preliminary adjustment manually (error rate display, jump test).
4. MANUAL 2 Mode	• Display the temperature. • Check the displayed value and adjust the attenuator manually. • Playback the recorded material continuously (error rate display, jump test).
5. TEST-PLAY Mode	• Perform continuous playback from the specified address. • Jump 1, 10, and 384 tracks manually. • C1 error rate display (pit section), ADIP error rate display (group section) • Perform attitude compensation during continuous playback. Perform temperature compensation only when starting up the servo.
6. TEST-REC Mode	• Perform continuous recording from the specified address. • Change of record laser output. (servo gain is also changed according to laser output.) • Perform attitude compensation during continuous playback. Perform temperature compensation only when starting up the servo.
7. NORMAL Mode	• Skip adjustment, and set the unit to the normal mode from the test mode. • Display the internal operation mode and memory volume in the normal mode. • Perform both the temperature and attitude compensations in the normal mode.
8. E_DATA (ERROR DATA DISPLAY MODE)	• Display error information. • Initialize error information.
9. EEPROM Mode	• Change coefficients of the digital servo manually (turn on each servo independently). • Select the cutoff frequency of BASS1, BASS2, and BASS3 manually. • Measure the temperature detection terminal voltage and set the referential value. • Select and set each default value. • Update the settings of the EEPROM protect area (when canceling the protection).

● Operation in each TEST mode

The unit enters the AUTO2 test mode when the MODE/DISPLAY button is pressed in the test mode STOP state. A test mode can be selected with the SKIP UP/DOWN buttons.

1. AUTO1 Mode

- If the STOP button is pressed in the AUTO1 menu or during automatic adjustment, the unit enters the test mode STOP state. At this time, the adjustment value will not be displayed.
- Make sure to perform adjustment by using the specified disc MMD-213A.
- Adjustment NG; displayed when the adjustment value of each item is out of the allowable range, the focus cannot be set to ON, or an adjustment error occurs.
- AUTO2 starts by pressing the PLAY button while ADJ. OK is displayed.

2. AUTO2 Mode

- If the STOP button is pressed in the AUTO2 menu or during automatic adjustment, the unit enters the test mode STOP state. At this time, the adjustment value will not be displayed.
- Adjustment NG is displayed when the adjustment value of each item is out of the allowable range or an adjustment error occurs.
- TEST_PLAY starts by pressing the PLAY button while ADJ. OK is displayed.

3. MANUAL1 Mode

- Adjustments performed in AUTO1 mode is to be performed manually.
- The set value increases and new set value is output by pressing the VOLUME + button during adjustment.
- The set value decreases and new set value is output by pressing the VOLUME – button during adjustment.
- The value changes at 100ms intervals consecutively while the VOLUME +/– button is pressed down.

* The set value changes digit by digit in this operation. To change another digit of the value, press the MODE/DISPLAY button.

- RANDOM is displayed if each set value is within the allowable range.
- If the STOP button is pressed during measurement, adjustment or in the MANU1 menu, the unit enters the test mode STOP state.

4. MANUAL2 Mode

- Adjustments performed in AUTO2 mode is to be performed manually.
- The set value increases and new set value is output by pressing the VOLUME + button during adjustment.
- The set value decreases and new set value is output by pressing the VOLUME – button during adjustment.
- The value changes at 100ms intervals consecutively while the VOLUME +/– button is pressed down.

* The set value changes digit by digit in this operation. To change another digit of the value, press the MODE/DISPLAY button.

- RANDOM is displayed if each set value is within the allowable range.
- If the STOP button is pressed during measurement, adjustment or in the MANU2 menu, the unit enters the test mode STOP state.
- Pressing the PLAY button in the B-ATT setting state (HB_ ✳✳✳ or LB_ ✳✳✳ is displayed) starts continuous playback.
- For operations during continuous playback, refer to "TEST-PLAY mode".

5. TEST-PLAY Mode

- The unit enters the test mode STOP state when the STOP button is pressed in the TEST-PLAY menu, TEST-PLAY mode, or continuous playback mode.
- If the PLAY button is pressed in the TEST-PLAY menu, continuous playback starts from the position where the pickup lens is located.
- In the TEST-PLAY menu, the target address changes as follows at each press of the GROUP/CLEAR button.

  0032 — 03C0 — 0700 — 08A0 — 0950— 0032 —

  If the PLAY button is pressed while the target address is displayed, continuous playback starts after it is searched for.
- While the TEST-PLAY mode target address is displayed, the cursor indicating the digit to be changed with the SKIP UP/DOWN button shifts as follows at each press of the MODE/DISPLAY button.

  00<u>3</u>2 — 00<u>3</u>2 — 0<u>0</u>32 — <u>0</u>032 —
- If the SKIP UP button is pressed while the TEST-PLAY mode target address is displayed, the number of the digit in the address specified by the MODE/DISPLAY button is changed to “+01H” (0 - F).
- If the SKIP DOWN button is pressed while the TEST-PLAY mode target address is displayed, the number of the digit in the address specified by the MODE/DISPLAY button is changed to “–01H” (0 - F).

* The value changes at 100ms intervals continuously while the SKIP UP/DOWN button is pressed down.

• When the MENU button is pressed in the continuous playback mode, the number of jump lines changes as follows.

1 — 10 — 100 step — 1 —

* After the number of tracks to be jumped is displayed for 1 second, the address will reappear.[▲▲▲▲ T R_]

• Specified number of tracks are jumped over in the FWD direction by pressing the SKIP UP button during continuous playback.

• Specified number of tracks are jumped over in the REV direction by pressing the SKIP DOWN button during continuous playback.

* Tracks are jumped over at 100ms intervals continuously while the SKIP UP/DOWN button is pressed down.

• The display changes as follows at each press of the GROUP/CLEAR button in the continuous

* Pre-mastered disc

Continuous playback [S Q □□□□]
(SUBQ address indication)
|
Continuous playback (C1 error indication) [C E ☆☆☆☆]
|
Continuous playback [S Q □□□□]
(SUBQ address indication)
|

* Recordable disk

Continuous playback [A P □□□□]
(ADIP address indication)
|
Continuous playback (C1 error indication) [C E ☆☆☆☆]
|
Continuous playback (ADIP error indication) [A E ★★★★]
|
Continuous playback [✳✳ b □□□]
(Focus balance display)
|

6. TEST-REC Mode

• The unit enters the test mode STOP state when the STOP button is pressed in the TEST-REC menu, TEST-REC mode, or continuous playback mode.

• In the TEST-REC menu, the target address changes as follows at each press of the GROUP/CLEAR button.

0032 — 03C0 — 0700 — 08A0 —0950 — 0032 —

If the PLAY button is pressed while the target address is displayed, continuous playback starts after it is searched for.

• While the TEST-REC mode target address is displayed, the cursor indicating the digit to be changed with the SKIP UP/DOWN button shifts as follows at each press of the MODE/DISPLAY button.

0032 — 0032 — 0032 — 0032 —

• If the SKIP UP button is pressed while the TEST-REC mode target address is displayed, the number of the digit in the address specified by the MODE/DISPLAY button is changed to “+01H” (0 - F).

• If the SKIP DOWN button is pressed while the TEST-REC mode target address is displayed, the number of the digit in the address specified by the MODE/DISPLAY button is changed to “–01H” (0 - F).

* The value changes at 100ms intervals continuously while the SKIP UP/DOWN button is pressed down.

• If the VOLUME +/– button is pressed in the start address setting state or in the continuous recording state, the recording power of the laser changes. (The servo gain also changes in accordance with the recording power.)

* After the laser recording power is displayed for 1 second, the address will reappear. [R P W _ ▽ ▽]

□□□□ : Address ▽▽ : Laser power cord

• If the pre-mastered disc or the disc is in the erase-prevention state, the unit does not function in this mode.

7. NORMAL Mode

• The unit enters the test mode STOP state when the STOP button is pressed in the NORMAL menu.

• Indication during operation

Indication of memory capacity on main unit LCD [✳✳ □□ ✳✳✳✳] + Level meter

✳✳ : Track number □□ : Internal mode ✳✳✳✳ : Address (Cluster section)

• The volume and bass control can be changed (not displayed).

• Recording is possible.

• If the STOP button is pressed during the operation in the NORMAL mode, the unit exits the NORMAL mode and the power if turned off.

8. E_DATA (Error data display Mode)

• Error codes are displayed in the reverse order by pressing the SKIP UP button.

• The unit enters the test mode STOP state by pressing the STOP button while in the error data display menu or each error data is displayed.

• Error data 0 is set as the latest error.

• Errors occurred in the test mode are also memorized.

• Error data is initialized if the GROUP/CLEAR button is pressed in the error data display mode. [C L E A R _]

◇◇ : Error Code

● Explanation of error history code

13 h : The limit number of servo retraction retry is exceeded.
16 h : C. IN detection time-over
17 h : A, B, E, F, TCRSO offset measured value is out of the allowable range.
21 h : The allowable time until focus retraction completion is exceeded.
23 h : The allowable time until track search completion is ex ceeded.
32 h : Unable to read P-TOC.
42 h : Unable to read U-TOC.
44 h : Unable to write data when U-TOC is written, or read check error.
45 h : U-TOC write test failed.
52 h : Unable to write data when SD is written.
71 h : Time over during initialization of pickup position.
72 h : Check sum error when EEPROM data is read.
73 h : Unable to drive the recording head (with the EJECT lever).
82 h : Overvoltage of the power supply detected.
91 h : The ambience temperature exceeds the allowable range.

● **Error List**

Can't (*)

* = f : Focus retraction
a : Servo adjustment
s : Search convergence
r : Data read
p : Spindle startup

Er-MD (**)

** = 80

"Er-MD80" is displayed when data is not read from EEPROM correctly.
(Data and the check sum are not identical.)
There may be a problem with either EEPROM or the communication path including the microcomputer.
When replacing the EEPROM, data needs resetting.
Refer to the service manual for details.

** = 41

"Er-MD41" is displayed when an error occurs while writing U-TOC for trial (recorders only).
(Data error found when reading data after it is written.)
There may be a problem with the recording head, recording signal generating circuit including the system LSI, or pickup laser.

T Form(*)

* = t : TNO information
a : Address information
L : Pointer information

EEPROM (IC402) writing procedure

Temperature reference setting method.

[1] Measurement, calculation and setting procedure.

(1) Set the TEST mode.
(2) Start the 'EEPROM' mode 'Temp' menu.
• Press the PLAY button.
• 'TM$$%%' is displayed. ($$= Temperature code, %% = Temperature reference)
(3) Once press SKIP UP, and determine the displayed microcomputer TEMP input AD value.
• 'TPin##' is displayed. (## = TEMP input AD value)
(4) At the ambient temperature, determine the temperature corrected value from the "temperature measurement value correction table".
(5) Determine the temperature reference, using the following formula.
• Temperature reference = Microcomputer TEMP input AD value + Temperature corrected value
(6) Set the temperature reference value by button operation, and check whether the temperature code indication corresponds to "Temperature Code Identification Table".

[2] Temperature measurement value correction table.

Ambient temperature	Temperature correction	Center temperature
+ 9 °C ~ +11 °C	– 05 h	+ 10.0 °C
+12 °C ~ +14 °C	– 04 h	+ 12.7 °C
+15 °C ~ +16 °C	– 03 h	+ 15.4 °C
+17 °C ~ +19 °C	– 02 h	+ 18.2 °C
+20 °C ~ +22 °C	– 01 h	+ 20.9 °C
+23 °C ~ +24 °C	± 00 h	+ 23.6 °C
+25 °C ~ +27 °C	+ 01 h	+ 26.3 °C
+28 °C ~ +30 °C	+ 02 h	+ 29.0 °C
+31 °C ~ +33 °C	+ 03 h	+ 31.8 °C

[3] Temperature code identification.

Ambient temperature	Temperature correction	Center temperature
– 9 °C ~ +10 °C	08 h	+ 0.5 °C
+ 3 °C ~ +21 °C	07 h	+ 12.5 °C
+15 °C ~ +33 °C	06 h	+ 23.6 °C
+26 °C ~ +43 °C	05 h	+ 35.0 °C

● EEPROM DATA LIST (EEPROM version : C)

Fucus setting

Item display	Set values
FG1 _ ○ ○	44 H
FG2 _ ○ ○	70 H
FF0 _ ○ ○	10 H
FF1 _ ○ ○	70 H
FF2 _ ○ ○	E8 H
Ff0 _ ○ ○	10 H
Ff1 _ ○ ○	48 H
Ff2 _ ○ ○	EA H
FZH _ ○ ○	ED H
FLn _ ○ ○	09 H
FLp _ ○ ○	06 H
DJG _ ○ ○	0F H
FSS _ ○ ○	28 H
FTS _ ○ ○	18 H
FSB _ ○ ○	40 H
FTB _ ○ ○	28 H
FGM _ ○ ○	66 H
TVG _ ○ ○	84 H
TO1 _ ○ ○	50 H
TO5 _ ○ ○	58 H
TOR _ ○ ○	58 H
PLE _ ○ ○	A0 H

Tracking setting

Item display	Set values
TG1 _ ○ ○	14 H
TG2 _ ○ ○	2A H
TF0 _ ○ ○	10 H
TF1 _ ○ ○	70 H
TF2 _ ○ ○	E0 H
Tf0 _ ○ ○	10 H
Tf1 _ ○ ○	40 H
Tf2 _ ○ ○	E4 H
TFS _ ○ ○	00 H
TBo _ ○ ○	20 H
TBt _ ○ ○	12 H
TKo _ ○ ○	20 H
TKt _ ○ ○	0D H
TDo _ ○ ○	67 H
TDt _ ○ ○	34 H
SCo _ ○ ○	00 H
SCt _ ○ ○	3A H
SCm _ ○ ○	48 H
CLp _ ○ ○	24 H
CLr _ ○ ○	30 H
JPI _ ○ ○	0E H
K10 _ ○ ○	65 H
THP _ ○ ○	02 H
THG _ ○ ○	02 H
TOP _ ○ ○	00 H
TOG _ ○ ○	F2 H

Tracking setting

Item display	Set values
T1P _ ○ ○	20 H
TSA _ ○ ○	20 H

Spindle setting

Item display	Set values
SPG _ ○ ○	30 H
SPi _ ○ ○	9A H
SPm _ ○ ○	62 H
SPo _ ○ ○	4F H
PGM _ ○ ○	E0 H
SP1 _ ○ ○	10 H
SP2 _ ○ ○	60 H
SP3 _ ○ ○	F2 H
SP4 _ ○ ○	F2 H
SP5 _ ○ ○	10 H
Sp2 _ ○ ○	60 H
Sp5 _ ○ ○	10 H
SD1 _ ○ ○	7F H
SD2 _ ○ ○	7F H
SPK _ ○ ○	EB H
MPG _ ○ ○	28 H
SPL _ ○ ○	60 H
SPW _ ○ ○	0F H
SPB _ ○ ○	66 H
SRi _ ○ ○	C0 H
SRm _ ○ ○	9A H
SRo _ ○ ○	7B H
SBR _ ○ ○	60 H
OSL _ ○ ○	14 H
PJB _ ○ ○	46 H

Sled setting

Item display	Set values
SKS _ ○ ○	7F H
SKL _ ○ ○	7F H
SLC _ ○ ○	26 H
STL _ ○ ○	07 H
STM _ ○ ○	42 H
STE _ ○ ○	A6 H
SDV _ ○ ○	60 H
SJP _ ○ ○	03 H
WTm _ ○ ○	18 H
SRV _ ○ ○	52 H
SLT _ ○ ○	5C H
MVS _ ○ ○	0A H
SLS _ ○ ○	28 H
SKE _ ○ ○	0E H
SDE _ ○ ○	1C H
BPE _ ○ ○	71 H
BPW _ ○ ○	75 H
BP1 _ ○ ○	33 H

Sled setting

Item display	Set values
BRE _ ○ ○	95 H
BRW _ ○ ○	33 H
SRS _ ○ ○	3C H

BASS setting

Item display	Set values
B1A _ ○ ○	00 H
RC0 _ ○ ○	C0 H
RC1 _ ○ ○	FE H
B2A _ ○ ○	00 H
R20 _ ○ ○	80 H
R21 _ ○ ○	20 H
B3A _ ○ ○	00 H
R40 _ ○ ○	BF H
R41 _ ○ ○	02 H

ADJ.SET setting

Item display	Set values
COK _ ○ ○	28 H
FAT _ ○ ○	C0 H
TAT _ ○ ○	3E H
CAT _ ○ ○	40 H
FAB _ ○ ○	✳✳ H

Digital EQ setting

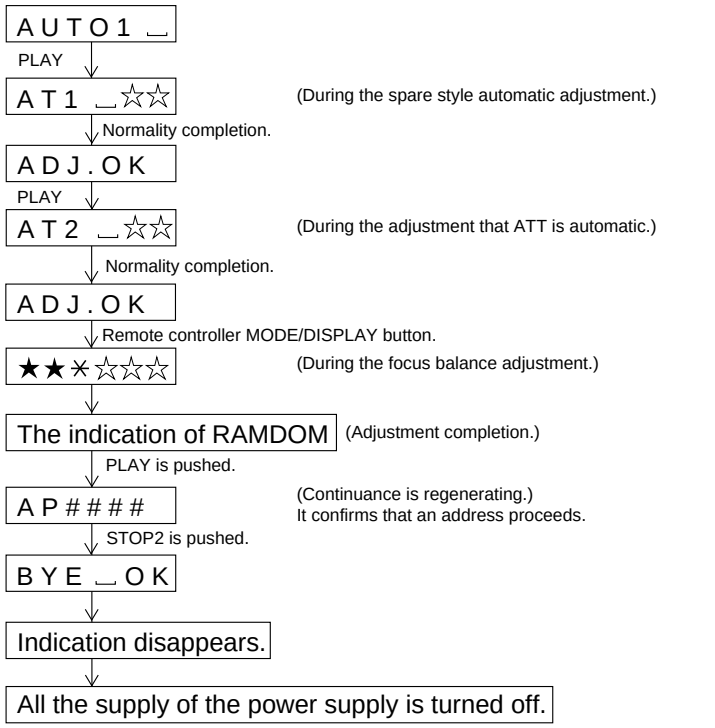
Item display	Set values
HQ1 _ ○ ○	90 H
HQ2 _ ○ ○	90 H
HSG _ ○ ○	11 H
HSO _ ○ ○	FF H
LQ1 _ ○ ○	90 H
LQ2 _ ○ ○	90 H
LSG _ ○ ○	12 H
LSO _ ○ ○	00 H
GQ1 _ ○ ○	98 H
GQ2 _ ○ ○	84 H
GSG _ ○ ○	12 H
EQR _ ○ ○	00 H

Control setting

Item display	Set values
CT0 _ ○ ○	02 H
CT1 _ ○ ○	01 H
CT2 _ ○ ○	32 H
CT3 _ ○ ○	50 H
USA _ ○ ○	18 H
RCE _ ○ ○	94 H
X2T _ ○ ○	C0 H
SDF _ ○ ○	1F H
FBO _ ○ ○	FC H
BHS _ ○ ○	00 H
FBL _ ○ ○	16 H
MC2 _ ○ ○	00 H
MC4 _ ○ ○	00 H
L2H _ ○ ○	81 H
L4H _ ○ ○	80 H
BS0 _ ○ ○	17 H
BS1 _ ○ ○	70 H
BU0 _ ○ ○	01 H
BD0 _ ○ ○	05 H
BD1 _ ○ ○	DC H
BMK _ ○ ○	1E H
BCE _ ○ ○	00 H
CST _ ○ ○	69 H
IJU _ ○ ○	81 H
IJD _ ○ ○	55 H
MCT _ ○ ○	61 H
ERC _ ○ ○	5A H
CV0 _ ○ ○	26 H
CV1 _ ○ ○	10 H
SSK _ ○ ○	D9 H
ACT _ ○ ○	63 H
C1E _ ○ ○	52 H
ADE _ ○ ○	00 H
MFP _ ○ ○	4B H
SPM _ ○ ○	00 H
MSL _ ○ ○	00 H
US0 _ ○ ○	00 H
US1 _ ○ ○	00 H
US2 _ ○ ○	00 H

Do the following when replacing the mechanism, the pickup, the EEPROM (IC402), the LSI(IC201) or the main PWB unit.

Enter the test mode, move the pickup to the most internal periphery and execute AUTO1.
(Use the disc of MMD-213A.)

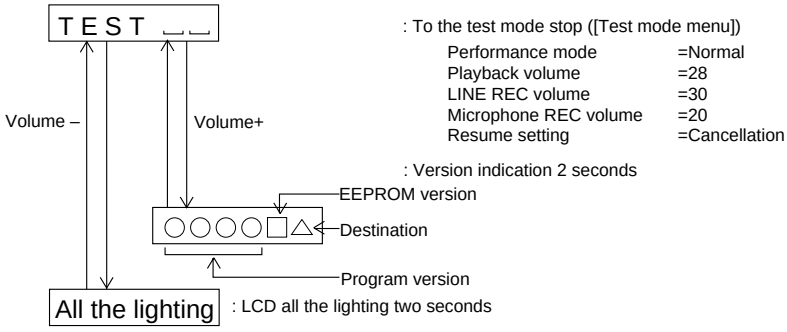


Use serviceable EEPROM (RH-IX2988AFZZ) for replacement.
The serviceable EEPROM is dedicated to MT899 with an authentication ID.
After replacement, write the default value in the microcomputer, and change it to the set value of the latest version.
Note) After that, be sure to perform the shipment setting.
(The battery indicator starts to operate correctly after you complete the setting.)

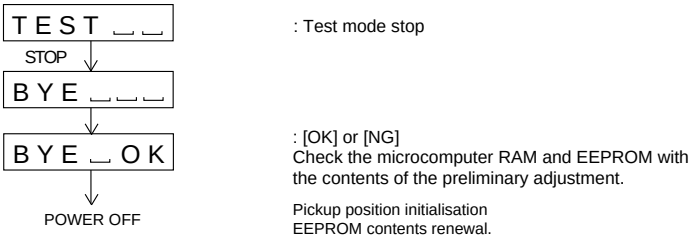
Test Mode Start · Completion method

• Starting method of the test mode
When the unit is in the stand-by state (with no display), the test mode is started by performing the following operation using the remote control.
Press the [PLAY] button while pressing the [MODE/DISPLAY] button, and release the [MODE/DIAPLAY] button while keeping the [PLAY] button pressed, and press the [VOLUME–] button.

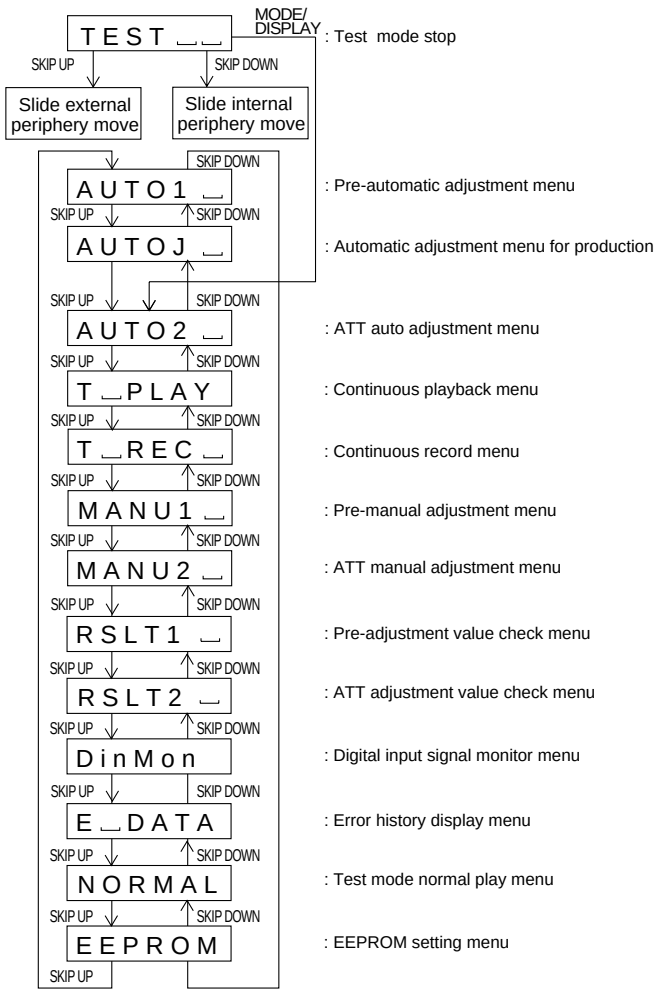
Indication after the start :



• How to cancel the test mode

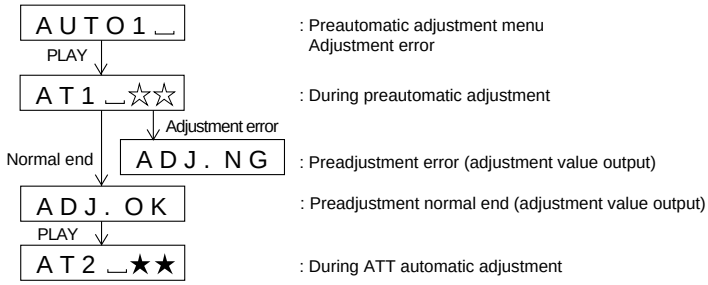


Change of Test Mode Menus



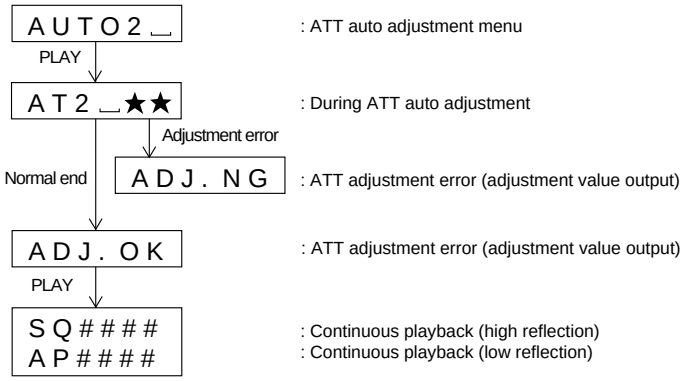
* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* When the [VOLUME+] button is pressed in the "TEST MODE STOP" state, the program version is displayed for 2 seconds.
* When the [VOLUME–] button is pressed in the "TEST MODE STOP" state, all the displays appear for 2 seconds.

Servo Preautomatic Adjustment



* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* Move the pickup lens manually to the innermost periphery before performing the servo preliminary auto adjustment. (Refer to "Change of test mode menus" for the operation method.)
* "☆☆" is the internal processing number, the meanings of the numbers are as follows.
  - 0 0 : Thread moving toward the most inner circumference
  - 0 2 : ABEF input offset measurement
  - 0 4 : AB input (ABMAXO) level setting
  - 0 5 : Focus ATT tentative setting
  - 0 6 : Pit section EF input level setting
  - 0 7 : COUT level setting for pit section adjustment
  - 0 8 : Sled external periphery move
  - 0 9 : Groove section EF input level setting
  - 1 0 : COUT level setting for groove section adjustment
  - 1 1 : TCRS input level setting
  - 1 2 : Tracking ATT initial setting
  - 1 3 : AB input (LPFABO) level setting
  - 1 4 : Focus ATT initial setting
  - 1 6 : TCRS input offset measurement
* It is necessary for each test mode where servo operation is made to complete the preliminary adjustment. (Otherwise, "ErADJ." appears.)
* The preliminary adjustment complete state is stored on the EEPROM (protected field).

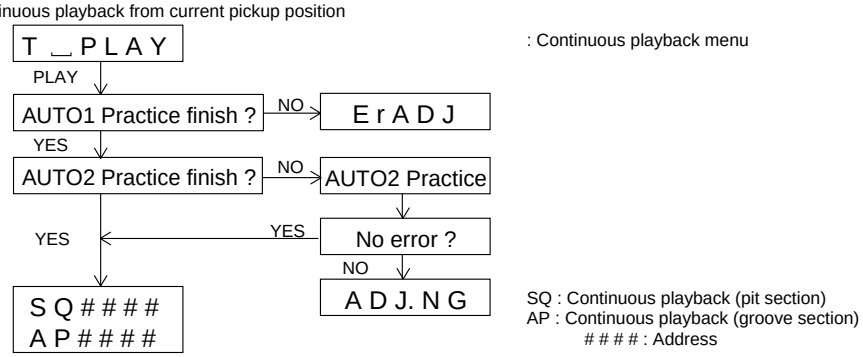
Servo ATT Auto Adjustment


A U T O 2 ␣
: ATT auto adjustment menu
PLAY
A T 2 ␣ ★★
: During ATT auto adjustment
Adjustment error
Normal end
A D J . N G
: ATT adjustment error (adjustment value output)
A D J . O K
: ATT adjustment error (adjustment value output)
PLAY
S Q # # # #
A P # # # #
: Continuous playback (high reflection)
: Continuous playback (low reflection)

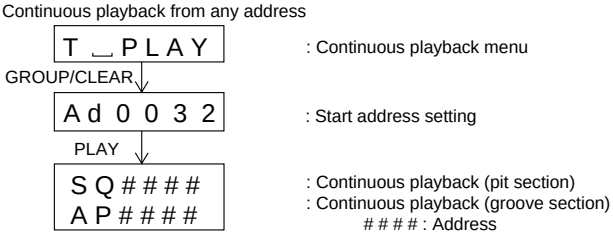
* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* Move the pickup lens manually to the innermost periphery before performing the servo ATT auto adjustment. (Refer to "Change of test mode menus" for the operation method.)
* "★★" represent the adjustment number as follows.
  - 0 0 : Thread moving toward the most inner circumference
  - 0 3 : Pit section tracking ATT setting
  - 0 4 : Pit section focus ATT setting
  - 0 6 : Sled external periphery move (low reflection only)
  - 0 7 : TCRS ATT setting (low reflection only)
  - 0 8 : Groove section tracking ATT setting (low reflection only)
  - 0 9 : Groove section focus ATT setting (low reflection only)

Continuous Playback

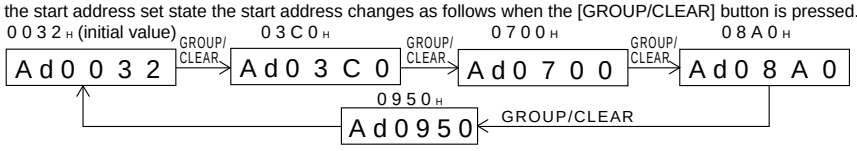
• Continuous playback from current pickup position



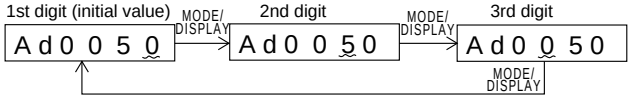
• Continuous playback from any address


T ␣ P L A Y
: Continuous playback menu
GROUP/CLEAR
A d 0 0 3 2
: Start address setting
PLAY
S Q # # # #
A P # # # #
: Continuous playback (pit section)
: Continuous playback (groove section)
: Address

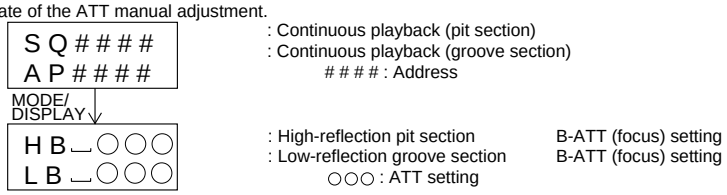
* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* In the start address set state the start address changes as follows when the [GROUP/CLEAR] button is pressed.


0 0 3 2 H (initial value)
GROUP/ CLEAR
0 3 C 0 H
GROUP/ CLEAR
0 7 0 0 H
GROUP/ CLEAR
0 8 A 0 H
A d 0 0 3 2
A d 0 3 C 0
A d 0 7 0 0
A d 0 8 A 0
0 9 5 0 H
A d 0 9 5 0
GROUP/CLEAR

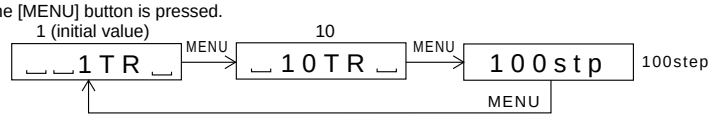
* In the start address setting state the start address change digit changes when the [MODE/DISPLAY] button is pressed.



* In the start address set state the value of selection digit changes in the range of "0h to Fh" when the [SKIP UP/DOWN] button is pressed.
* If the [MODE/DISPLAY] button is pressed in the continuous playback state, the mode is changed to the B-ATT setting state of the ATT manual adjustment.

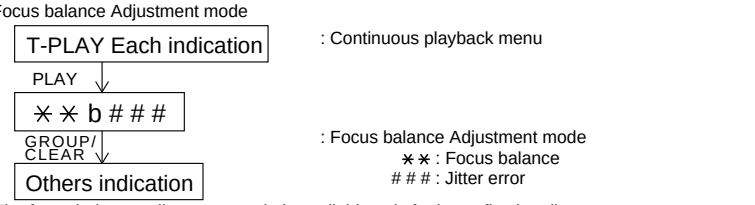

S Q # # # #
A P # # # #
: Continuous playback (pit section)
: Continuous playback (groove section)
: Address
MODE/ DISPLAY
H B ␣ ○ ○ ○
L B ␣ ○ ○ ○
: High-reflection pit section
: Low-reflection groove section
B-ATT (focus) setting
B-ATT (focus) setting
○ ○ ○ : ATT setting

* In the continuous playback state the number of jump lines changes as follows shown the [MENU] button is pressed.



* When the [SKIP UP] button is pressed in the continued playback mode, jump of specified number of lines occurs in the external periphery direction. If the key is held down jump occurs continuously. (100 ms cycle)
* When the [SKIP DOWN] button is pressed in the continuous playback mode, jump of specified number of lines occurs in the internal periphery direction. If the key is held down, jump occurs continuously. (100 ms cycle)

• Focus balance Adjustment mode

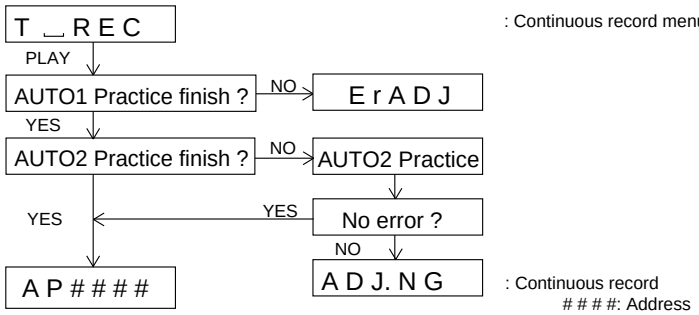


* The focus balance adjustment mode is available only for low reflection discs.
* The RANDOM marker lights up in the focus balance adjustment mode.
* The focus balance (✳✳) can be changed by the VOLUME +/– button operation.
* If the PLAY button is pressed in the focus balance adjustment mode, the unit returns to the continuous playback mode.

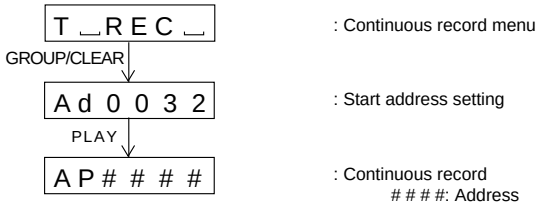
Continuous Record

Enter the EEPROM setting mode, and press the SKIP UP button.
Change the MSL setting value from 00 to 08 by using CTRL_ (control setting menu).
(If the MSL remains in 00, no signal is recorded.)

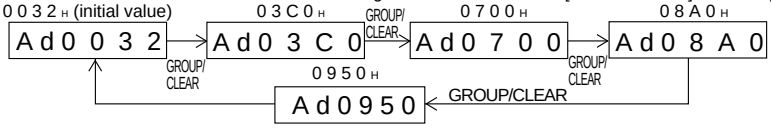
• Continuous record from the current pickup position



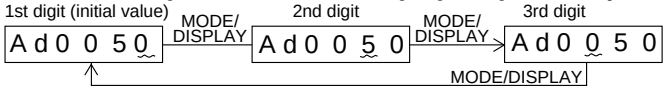
• Continuous record playback from any address



* When the [STOP] button is pressed in specific condition, the "TEST MODE STOP" state is set.
* In the start address set state the start address changes as follows when the [GROUP/CLEAR] button is pressed.

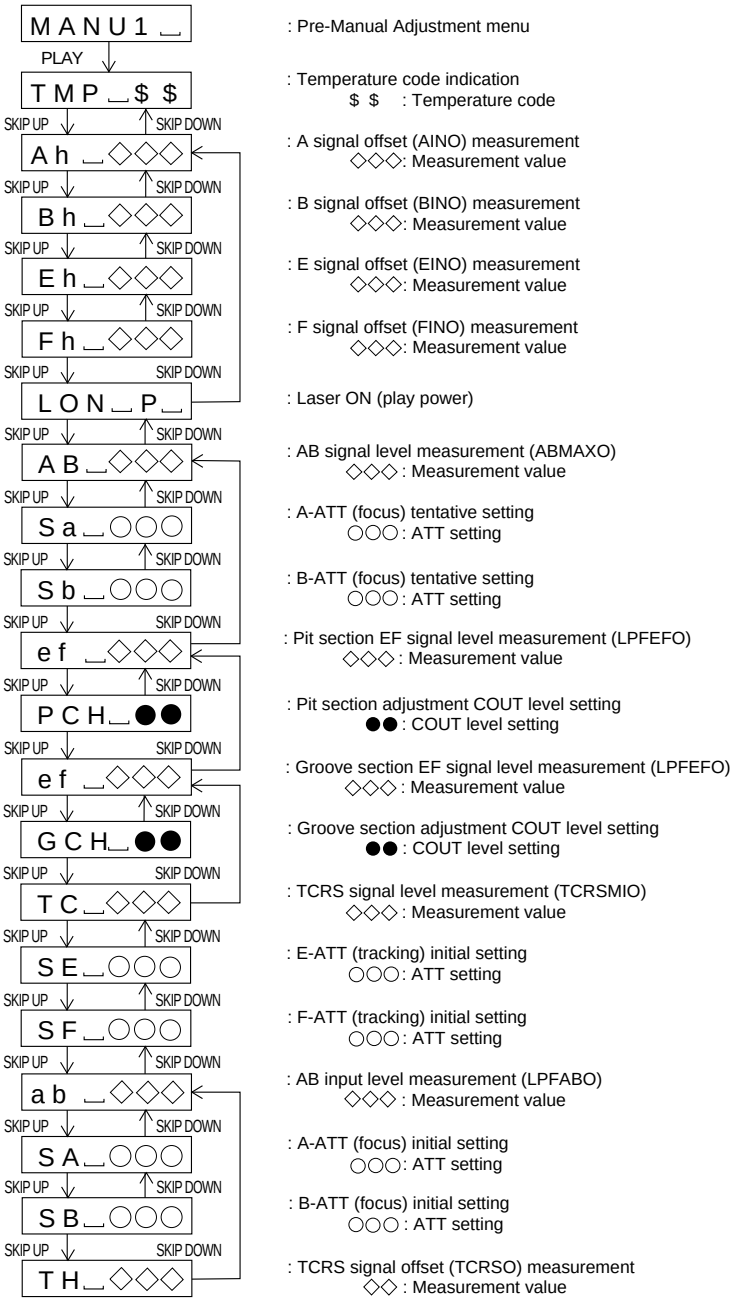


* In the start address setting state the start address change digit changes when the [MODE/DISPLAY] button is pressed.

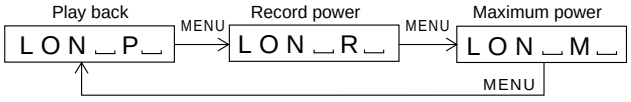


* In the start address set state the value of selection digit changes in the range of 0h to Fh when the [SKIP UP/DOWN] button is pressed.
* In the continuous record state and start address set state the record laser power changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed. (Initial value 0DH)

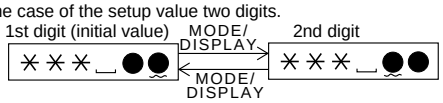
Servo Pre-Manual Adjustment



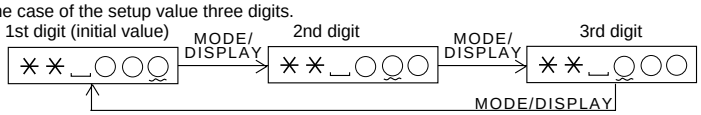
* When the [STOP] button is pressed in specific condition, the "TEST MODE STOP" state is set.
* When you press the [MENU] button with the laser ON (with no disc or the lid open), the laser power shifts as follows.



* In the specific setting display state the setting change digit changes when the [MODE/DISPLAY] button is pressed.
  • In the case of the setup value two digits.

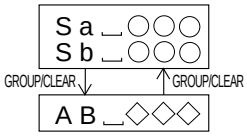


  • In the case of the setup value three digits.



* In the specific state the setting changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed.
* If the [GROUP/CLEAR] button is pressed, the display changes as follows.

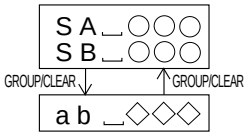
• ABMAXO measurement value



: A-ATT (focus) tentative setting
: B-ATT (focus) tentative setting

: ABMAXO measurement value indication
"1" Mark lighting

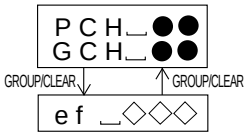
• LPFABO measurement value



: A-ATT (focus) tentative setting
: B-ATT (focus) tentative setting

: LPFABO measurement value indication
"1" Mark lighting

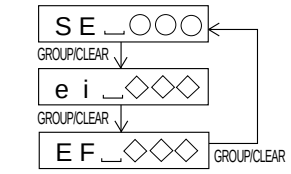
• LPFEFO measurement value



: Pit section adjustment COUT level setting
: Group section adjustment COUT level setting

: LPFEFO measurement value indication
"1" Mark lighting

• LPFEINO/EFMIO measurement value

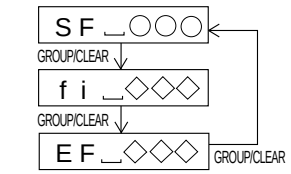


: E-ATT (tracking) initial setting

: LPFEINO measurement value indication
"1" Mark lighting

: EFMIO measurement value indication
"REPEAT", "1" Mark lighting

• LPFFINO/EFMIO measurement value

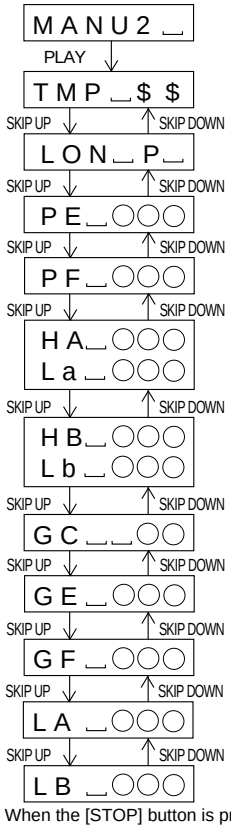


: F-ATT (tracking) initial setting

: LPFFINO measurement value indication
"1" Mark lighting

: EFMIO measurement value indication
"REPEAT", "1" Mark lighting

Servo ATT Manual Adjustment



: ATT manual adjustment menu

: Temperature code indication
$ $: Temperature code

: Laser ON (play power)

: Pit section E-ATT (tracking) setting
◯◯◯ : ATT setting

: Pit section F-ATT (tracking) setting
◯◯◯ : ATT setting

: High reflection A-ATT (focus) setting
: Low reflection A-ATT (focus) setting
◯◯◯ : ATT setting

: High reflection B-ATT (focus) setting
: Low reflection B-ATT (focus) setting
◯◯◯ : ATT setting

: TCRS ATT setting
◯◯ : ATT setting

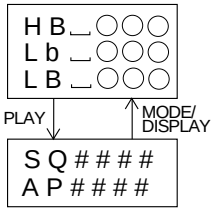
:Groove section E-ATT (tracking) setting
◯◯◯ : ATT setting

:Groove section F-ATT (tracking) setting
◯◯◯ : ATT setting

: Low reflection A-ATT (focus) setting
◯◯◯ : ATT setting

: Low reflection B-ATT (focus) setting
◯◯◯ : ATT setting

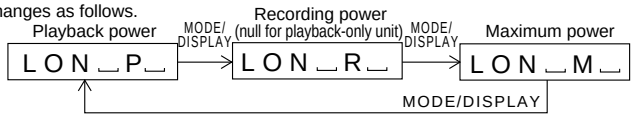
* When the [STOP] button is pressed in specific condition, the "TEST MODE STOP" state is set.
* If the [PLAY] button is pressed in the B-ATT setting state, the mode is changed to the continuous playback mode.
And if the [MODE/DISPLAY] button is pressed in the continuous playback state, the mode is changed to the B-ATT setting state of the ATT manual adjustment.



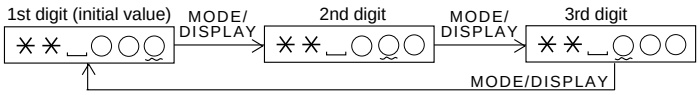
: High-reflection pit section B-ATT (focus) setting
: Low-reflection pit section B-ATT (focus) setting
: Low-reflection groove section B-ATT (focus) setting
○○○ : ATT setting

: Continuous playback (pit section)
: Continuous playback (groove section)
: Address

* If the [MODE/DISPLAY] button is pressed in the laser ON state (with no disc or the lid open), laser power changes as follows.

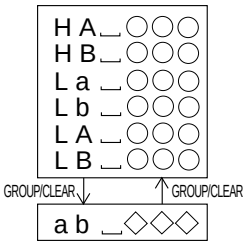


* In the specific setting display state the setting change digit changes when the [MODE/DISPLAY] button is pressed.



* In the specific state the setting changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed.
* If the [GROUP/CLEAR]button is pressed, the display changes as follows.

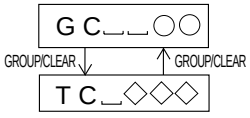
• LPFABO measurement value



: High-reflection pit section A-ATT (focus) setting
: High-reflection pit section B-ATT (focus) setting
: Low-reflection pit section A-ATT (focus) setting
: Low-reflection pit section B-ATT (focus) setting
: Low-reflection groove section A-ATT (focus) setting
: Low-reflection groove section B-ATT (focus) setting

: LPFABO measurement value indication
"1" Mark lighting

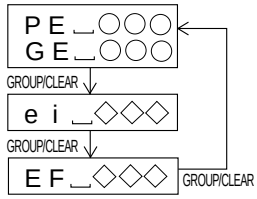
• TCRSMIO measurement value



: TCRS ATT setting

: TCRSMIO measurement value indication
"1" Mark lighting

• LPFEINO/EFMIO measurement value

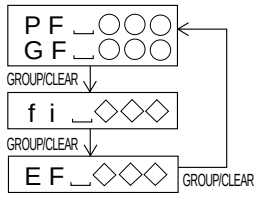


: Pit section E-ATT (tracking) setting
: Groove section E-ATT (tracking) setting

: LPFEINO measurement value indication
"1" Mark lighting

: EFMIO measurement value indication
"REPEAT", "1" Mark lighting

• LPFFINO/EFMIO measurement value

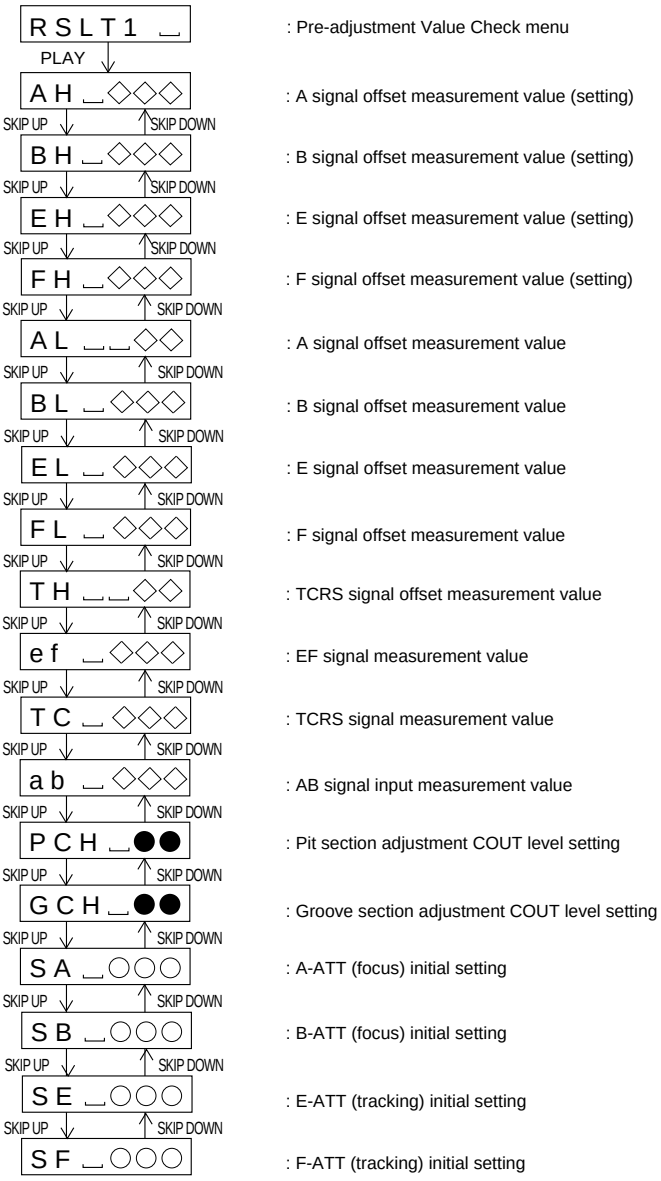


: Pit section F-ATT (tracking) setting
: Groove section F-ATT (tracking) setting

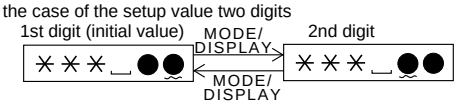
: LPFFINO measurement value indication
"1" Mark lighting

: EFMIO measurement value indication
"REPEAT", "1" Mark lighting

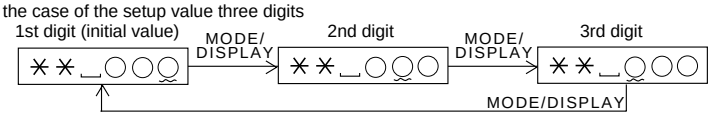
Servo Pre-adjustment Value Check


RSLT1 : Pre-adjustment Value Check menu
PLAY
AH ◇◇◇ : A signal offset measurement value (setting)
BH ◇◇◇ : B signal offset measurement value (setting)
EH ◇◇◇ : E signal offset measurement value (setting)
FH ◇◇◇ : F signal offset measurement value (setting)
AL ◇◇ : A signal offset measurement value
BL ◇◇◇ : B signal offset measurement value
EL ◇◇◇ : E signal offset measurement value
FL ◇◇◇ : F signal offset measurement value
TH ◇◇ : TCRS signal offset measurement value
ef ◇◇◇ : EF signal measurement value
TC ◇◇◇ : TCRS signal measurement value
ab ◇◇◇ : AB signal input measurement value
PCH ●● : Pit section adjustment COUT level setting
GCH ●● : Groove section adjustment COUT level setting
SA ○○○ : A-ATT (focus) initial setting
SB ○○○ : B-ATT (focus) initial setting
SE ○○○ : E-ATT (tracking) initial setting
SF ○○○ : F-ATT (tracking) initial setting
SKIP UP
SKIP DOWN

* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* In the specific setting display state the setting change digit changes when the [MODE/DISPLAY] button is pressed.
  • In the case of the setup value two digits

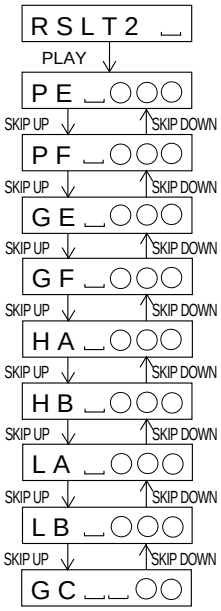


  • In the case of the setup value three digits



* In the specific state the setting changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed.

ATT Setting Check



: ATT Setting Check menu

: Pit section E-ATT (tracking) setting

: Pit section F-ATT (tracking) setting

: Groove section E-ATT (tracking) setting

: Groove section F-ATT (tracking) setting

: High-reflection A-ATT (focus) setting

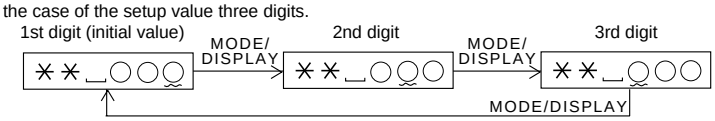
: High-reflection B-ATT (focus) setting

: Low-reflection A-ATT (focus) setting

: Low-reflection B-ATT (focus) setting

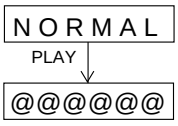
: TCRS-ATT setting

* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* In the specific setting display state the setting change digit changes when the [MODE/DISPLAY] button is pressed.
  • In the case of the setup value three digits.



* In the specific state the setting changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed.

Test Mode Normal Playback



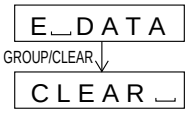
: Test mode normal playback menu

: Continuous playback mode
@@@@@@: Mode and address indication

* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.

Error History Display

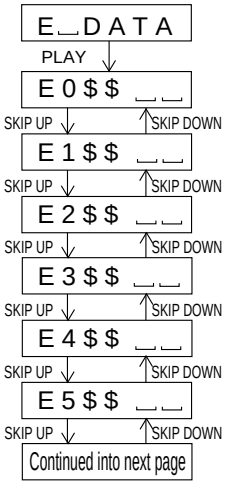
• Error history clear



: Error history indication menu

: Error history clear

• Error history indication



: Error history indication menu

: Error history 0 indication
$ $: Error code

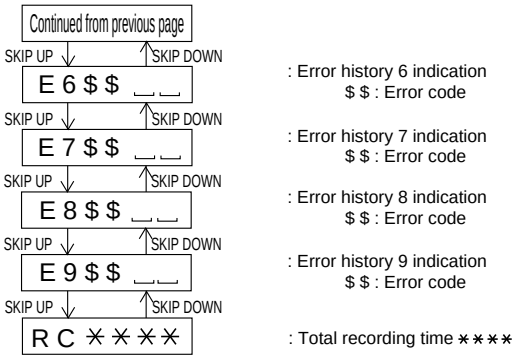
: Error history 1 indication
$ $: Error code

: Error history 2 indication
$ $: Error code

: Error history 3 indication
$ $: Error code

: Error history 4 indication
$ $: Error code

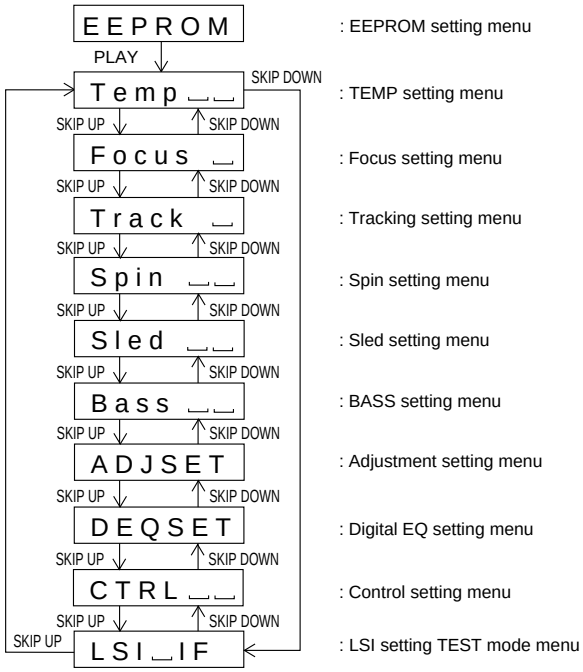
: Error history 5 indication
$ $: Error code


Continued from previous page
SKIP UP
SKIP DOWN
E 6 $ $ _ _
: Error history 6 indication
$ $: Error code
E 7 $ $ _ _
: Error history 7 indication
$ $: Error code
E 8 $ $ _ _
: Error history 8 indication
$ $: Error code
E 9 $ $ _ _
: Error history 9 indication
$ $: Error code
R C ✳ ✳ ✳ ✳
: Total recording time ✳✳✳✳

* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.

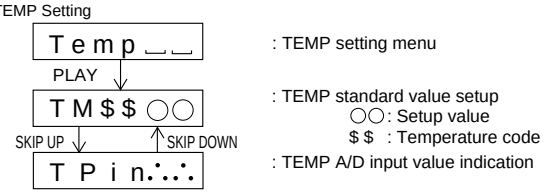
EEPROM Setting

• Menu transition

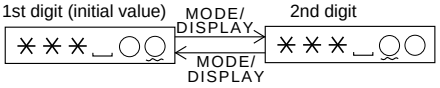

E E P R O M
: EEPROM setting menu
PLAY
SKIP UP
SKIP DOWN
T e m p _ _
: TEMP setting menu
F o c u s _
: Focus setting menu
T r a c k _
: Tracking setting menu
S p i n _ _
: Spin setting menu
S l e d _ _
: Sled setting menu
B a s s _ _
: BASS setting menu
A D J S E T
: Adjustment setting menu
D E Q S E T
: Digital EQ setting menu
C T R L _ _
: Control setting menu
L S I _ I F
: LSI setting TEST mode menu

* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.

• TEMP Setting



* When the [STOP] button is pressed in specific menu, the "TEST MODE STOP" state is set.
* When the [GROUP/CLEAR] button operation is performed in the specific state, the menu changes to "TEMP SETTING menu".
* When the [MODE/DISPLAY] button is pressed in each state, the set digit is changed.



* In the specific state the setting changes in the range of "0h to Fh" when the [VOLUME +/–] button is pressed.

NOTES ON SCHEMATIC DIAGRAM

• Resistor:
To differentiate the units of resistors, such symbol as K and M are used: the symbol K means 1000 ohm and the symbol M means 1000 kohm and the resistor without any symbol is ohm-type resistor. Besides, the one with “Fusible” is a fuse type.

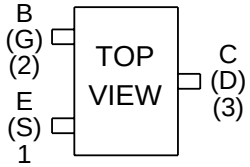
• Capacitor:
To indicate the unit of capacitor, a symbol P is used: this symbol P means pico-farad and the unit of the capacitor without such a symbol is microfarad. As to electrolytic capacitor, the expression “capacitance/withstand voltage” is used.
(CH), (TH), (RH), (UJ): Temperature compensation
(ML): Mylar type

• The indicated voltage in each section is the one measured by Digital Multimeter between such a section and the chassis with no signal given.

• Parts marked with “ ⚠ ” (⊏ ニ ニ ニ ⊐) are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

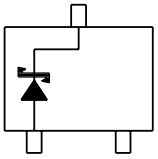
REF. NO	DESCRIPTION	POSITION
SW401	EJECT	OFF—ON
SW402	OPEN/CLOSE	OFF—ON
SW901	DISC PROTECT	OFF—ON
SWA01	RECORD	OFF—ON
SWA02	PLAY	OFF—ON
SWA03	STOP	OFF—ON
SWA04	SKIP UP	OFF—ON
SWA05	SKIP DOWN	OFF—ON
SWA06	VOLUME +	OFF—ON
SWA07	VOLUME –	OFF—ON
SWA08	MODE	OFF—ON
SWA09	SYNCHRONISED RECORDING	OFF—ON

TYPES OF TRANSISTOR AND DIODE

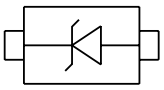


2SA17457
2SB1462 J
2SC4617 R
2SD2351 W
MCH3409
RT1N441 U

TOP VIEW

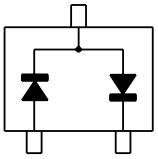


F10J2E



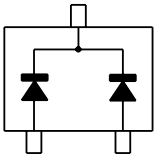
015Z5.1Y
15AZ6.2Y
15AZ7.5Y
RB520S30
MA8075M
1SS388
1SS389
FS1J2EA

TOP VIEW



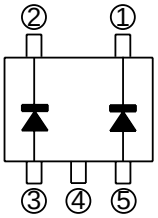
HRB0103B
1SS372

TOP VIEW

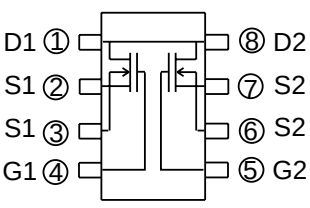


MA132WK
1SS302

TOP VIEW

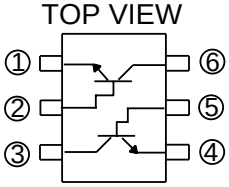


SBE803



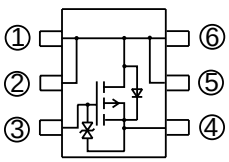
FTD2017

TOP VIEW



XP04313
XP04501

TOP VIEW



SSM6J08FU

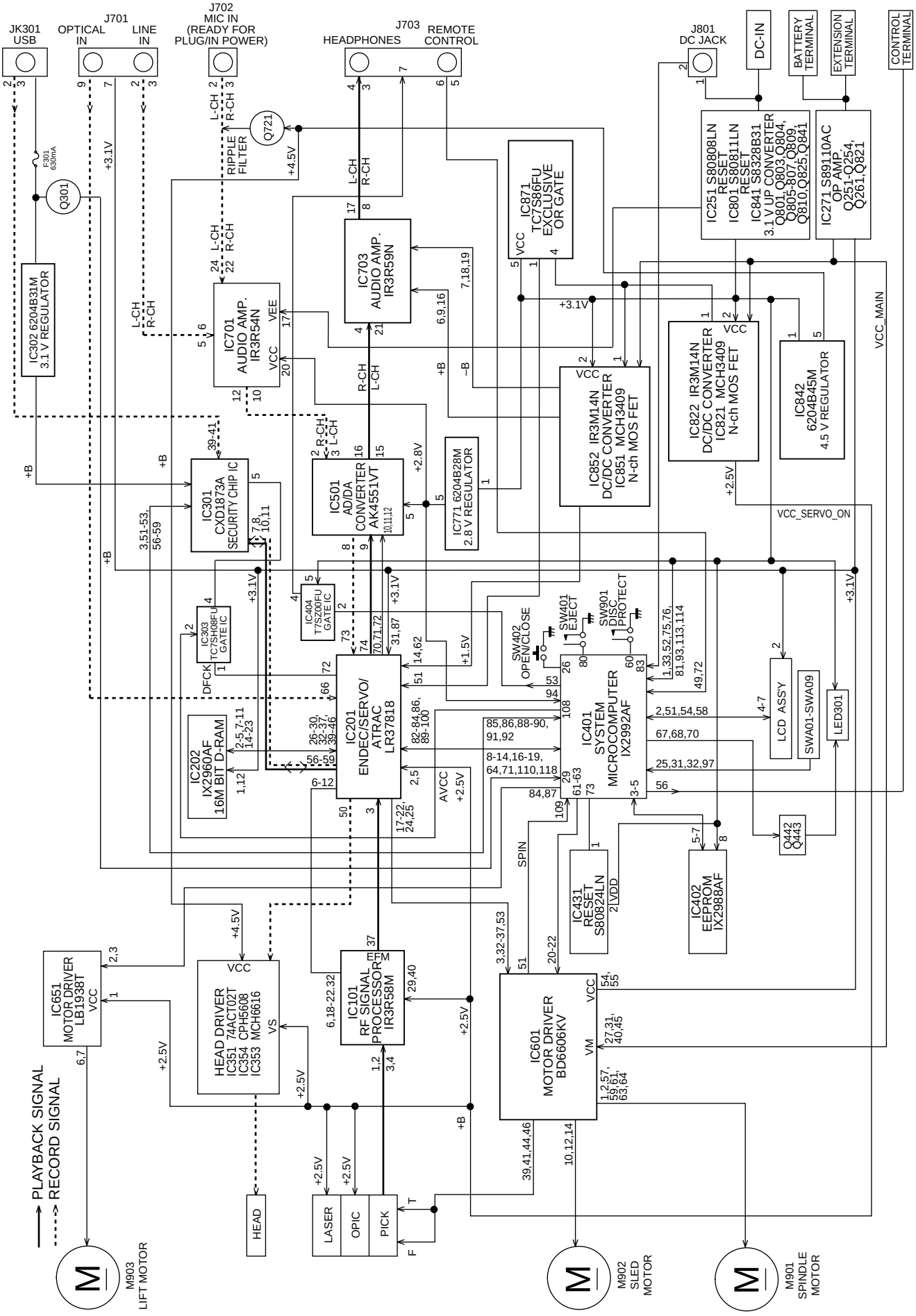
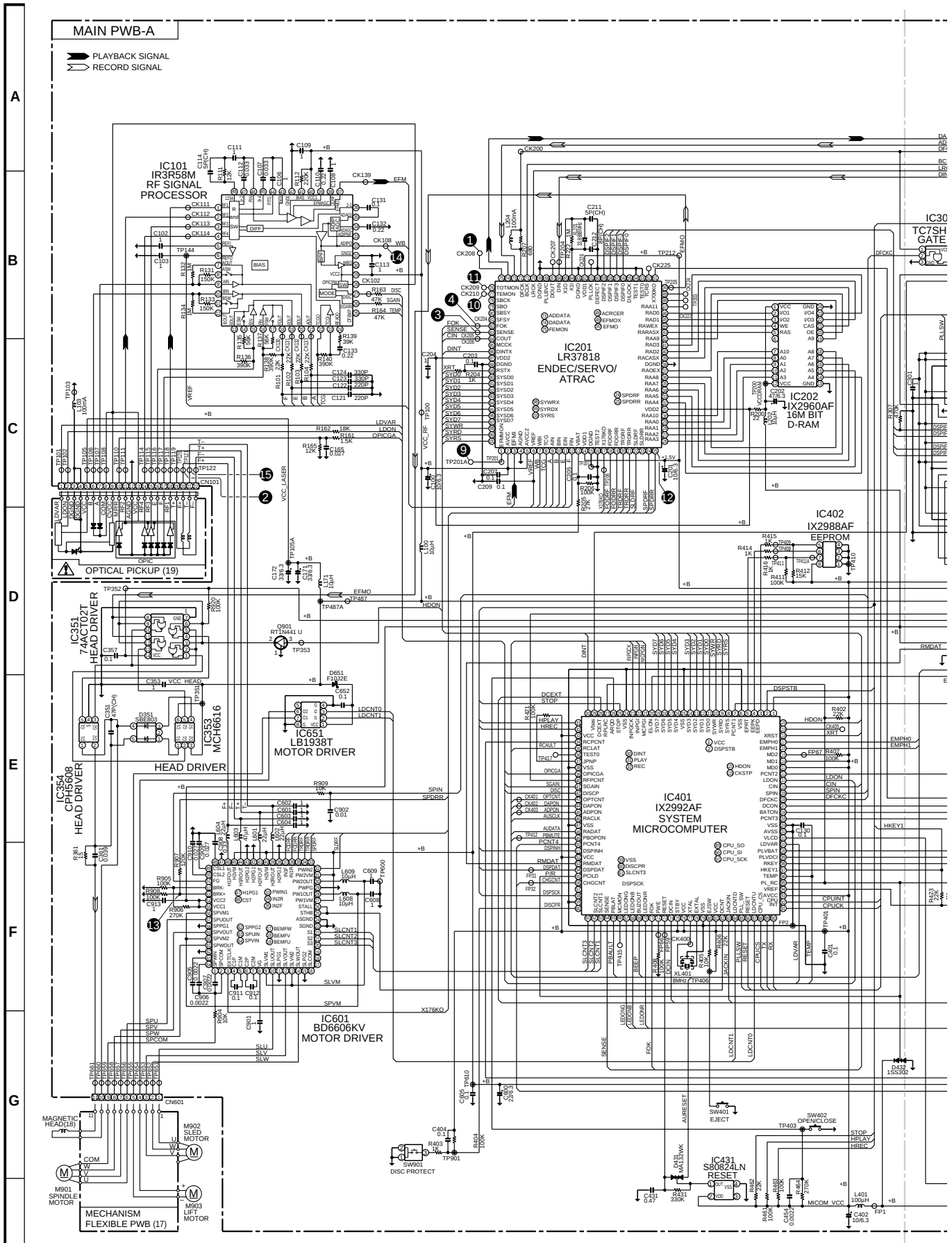


Figure 29 BLOCK DIAGRAM



- NOTES ON SCHEMATIC DIAGRAM can be found on page 28.
- The numbers ❶ to ⓯ are waveform numbers shown in page 38.

Figure 30 SCHEMATIC DIAGRAM (1/2)

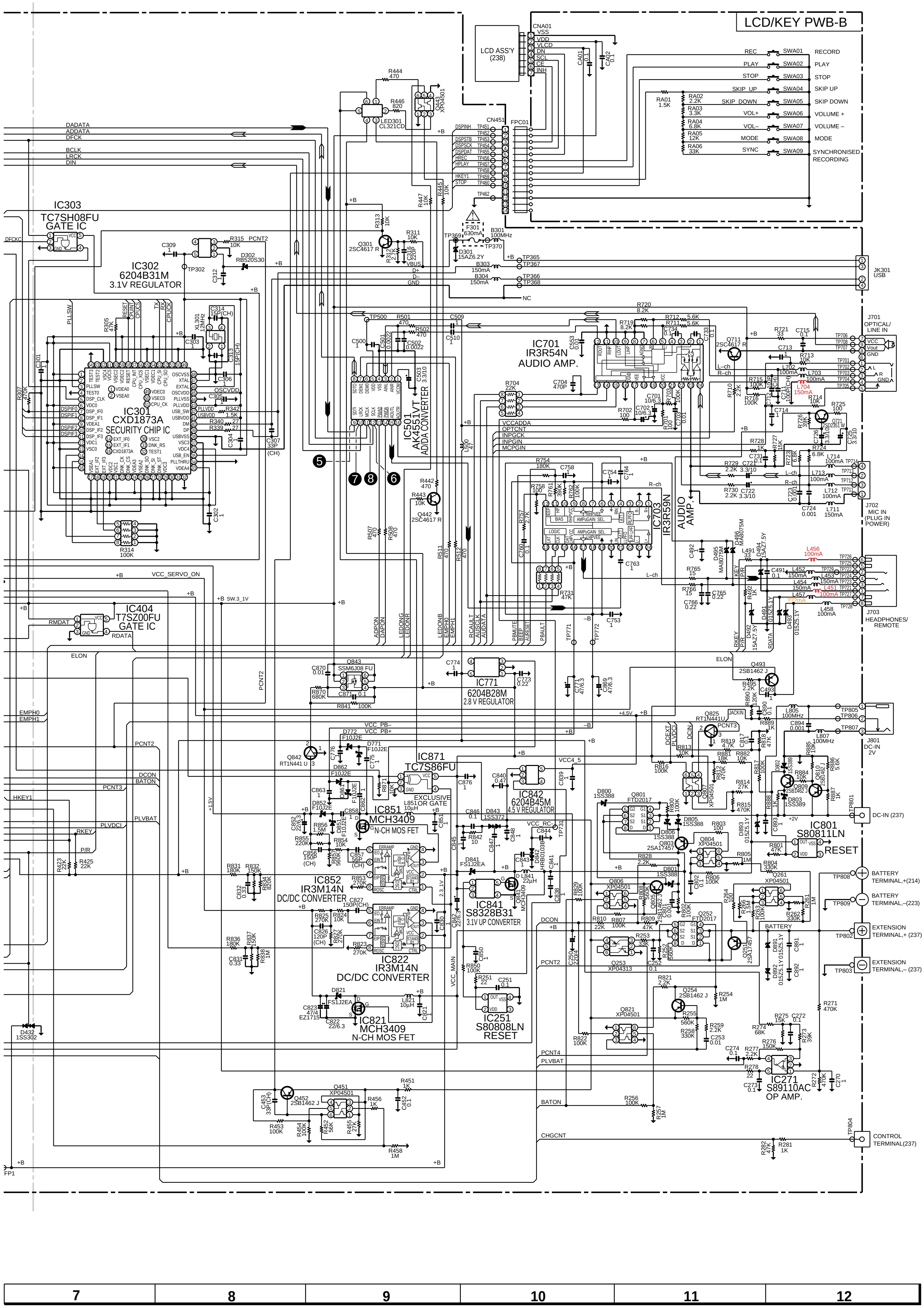
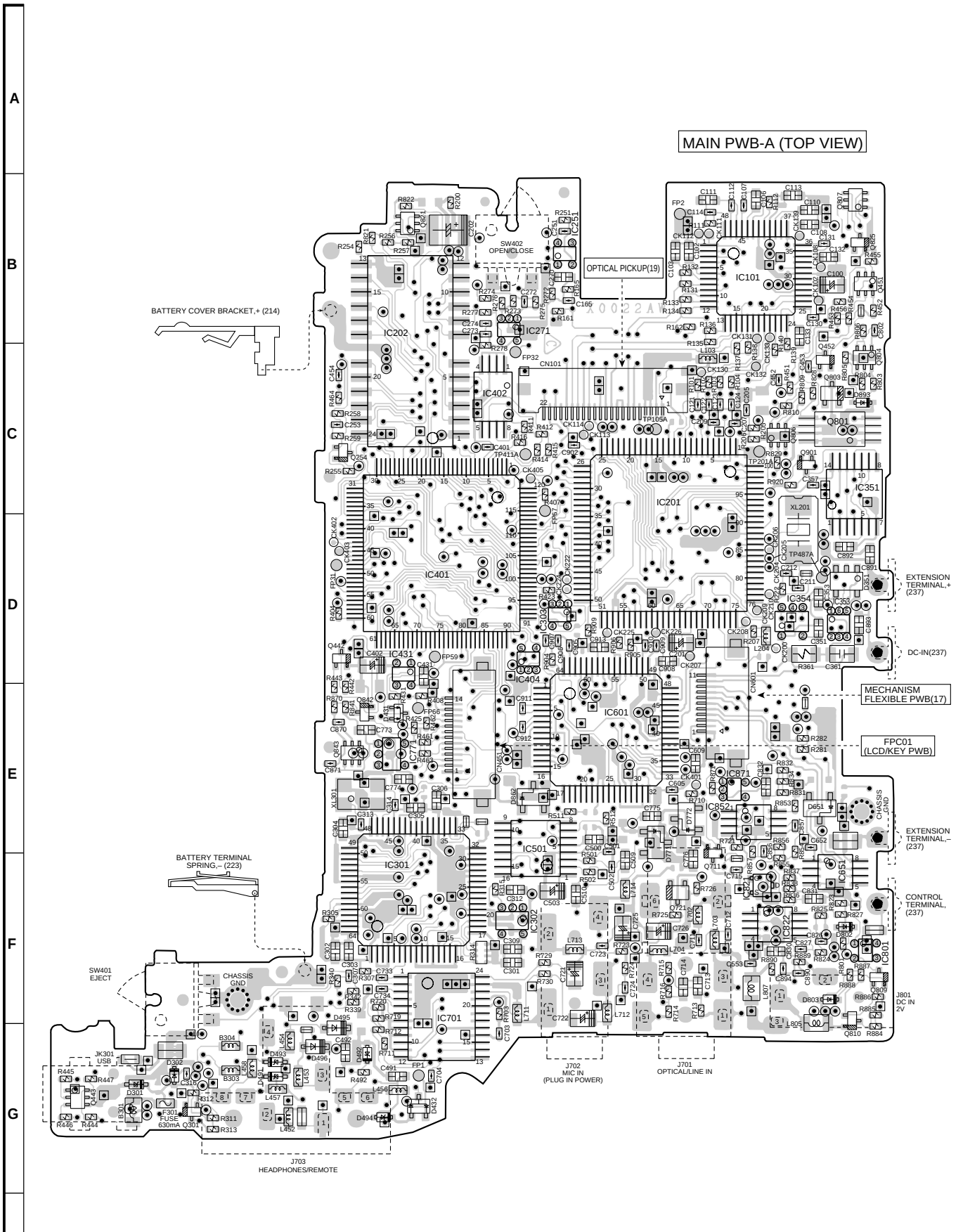

LCD/KEY PWB-B
LCD ASS'Y (238)
CNA01
VSS
VDD
VLCD
DN
SCL
CE
INH
REC SWA01 RECORD
PLAY SWA02 PLAY
STOP SWA03 STOP
SKIP_UP SWA04 SKIP UP
SKIP_DOWN SWA05 SKIP DOWN
VOL+ SWA06 VOLUME +
VOL– SWA07 VOLUME –
MODE SWA08 MODE
SYNC SWA09 SYNCHRONISED RECORDING
CN451
FPC01
DADATA
ADDATA
DFCK
BCLK
LRCK
DIN
IC303
TC7SH08FU
GATE IC
IC302
6204B31M
3.1V REGULATOR
IC301
CXD1873A
SECURITY CHIP IC
IC501
AK4551VT
AD/DA CONVERTER
LED301
CL321CD
Q443
XP04501
Q301
2SC4617 R
F301
630mA
B301
100MHz
D301
15AZ6.2Y
JK301
USB
IC701
IR3R54N
AUDIO AMP.
J701
OPTICAL/
LINE IN
Q711
2SC4617 R
Q721
2SD2351 W
IC703
IR3R59N
AUDIO
AMP.
J702
MIC IN
(PLUG IN
POWER)
J703
HEADPHONES/
REMOTE
VCCADDA
OPTCNT
INPGCK
INPGIN
MCPGIN
IC404
T7SZ00FU
GATE IC
RMDAT
RDATA
VCC_SERVO_ON
ELON
Q843
SSM6J08 FU
IC771
6204B28M
2.8 V REGULATOR
Q493
2SB1462 J
Q825
RT1N441U
J801
DC-IN
2V
Q842
RT1N441 U
IC871
TC7S86FU
EXCLUSIVE
OR GATE
IC851
MCH3409
N-CH MOS FET
IC852
IR3M14N
DC/DC CONVERTER
IC842
6204B45M
4.5 V REGULATOR
IC841
S8328B31
3.1V UP CONVERTER
Q841
MCH3409
IC822
IR3M14N
DC/DC CONVERTER
IC821
MCH3409
N-CH MOS FET
IC251
S80808LN
RESET
IC801
S80811LN
RESET
Q801
FTD2017
Q252
FTD2017
Q803
2SA17457
Q804
XP04501
Q805
2SB1462 J
Q806
XP04501
Q809
2SB1462 J
Q810
2SB1462 J
Q261
XP04501
Q251
2SA17457
Q253
XP04313
Q254
2SB1462 J
Q821
XP04501
IC271
S89110AC
OP AMP.
Q451
XP04501
Q452
2SB1462 J
D432
1SS302
DC-IN (237)
BATTERY TERMINAL,+(214)
BATTERY TERMINAL,–(223)
EXTENSION TERMINAL,+ (237)
EXTENSION TERMINAL,– (237)
CONTROL TERMINAL(237)
DCON
BATON
PCNT2
PCNT3
PCNT4
PLVBAT
PLVDCI
CHGCNT
HKEY1
RKEY
P/R
EMPH0
EMPH1
FP1
7
8
9
10
11
12

Figure 31 SCHEMATIC DIAGRAM (2/2)

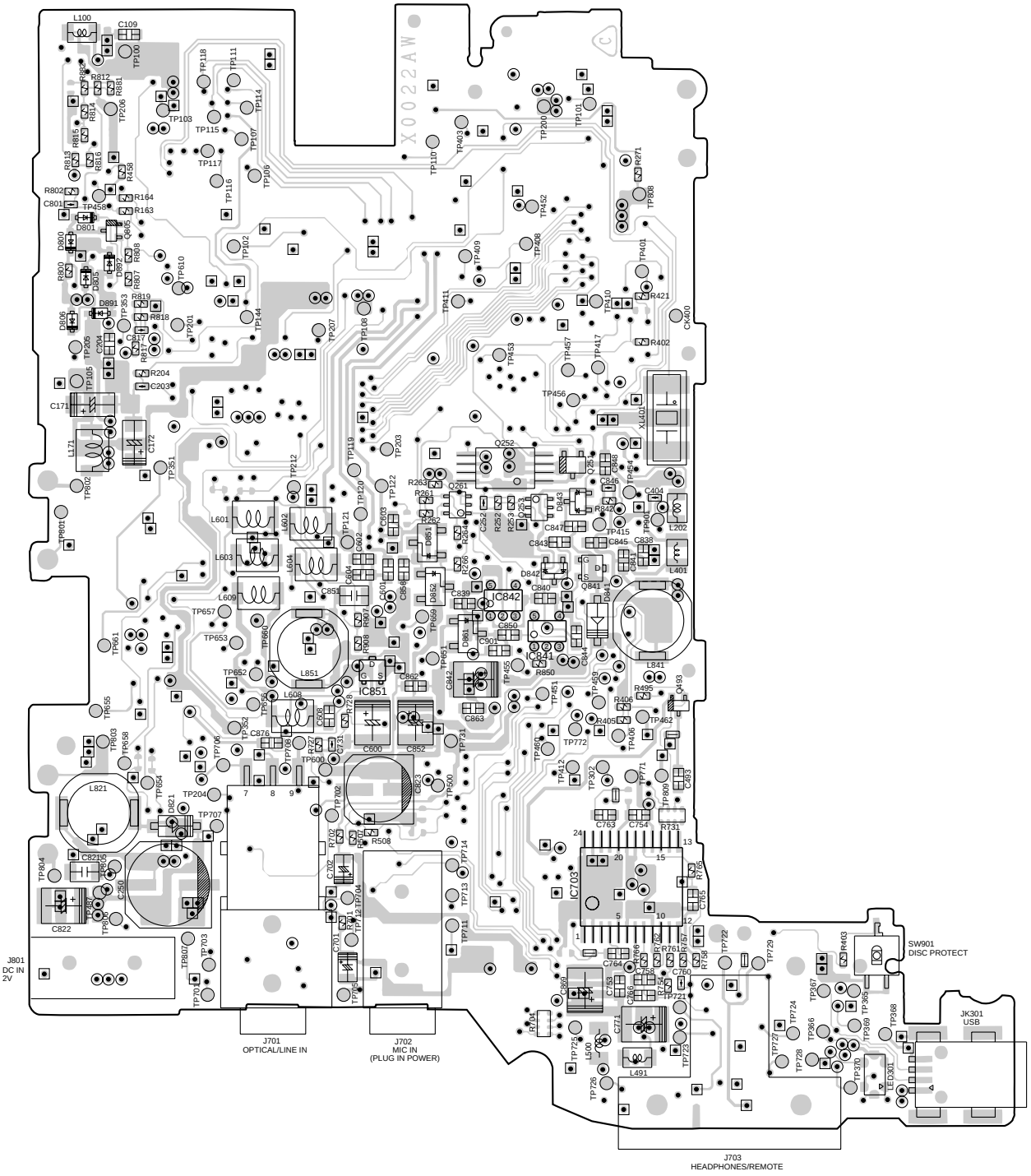


◉ : Through-hole where the top, bottom and +B patterns are connected.
◙ : Through-hole where the top, bottom and ground patterns are connected.
● : Through-hole where the top and bottom patterns are connected.

• The numbers 1 to 15 are waveform numbers shown in page 38.

Figure 32 WIRING SIDE OF P.W.BOARD (1/4)

MAIN PWB-A (BOTTOM VIEW)



7	8	9	10	11	12

Figure 33 WIRING SIDE OF P.W.BOARD (2/4)

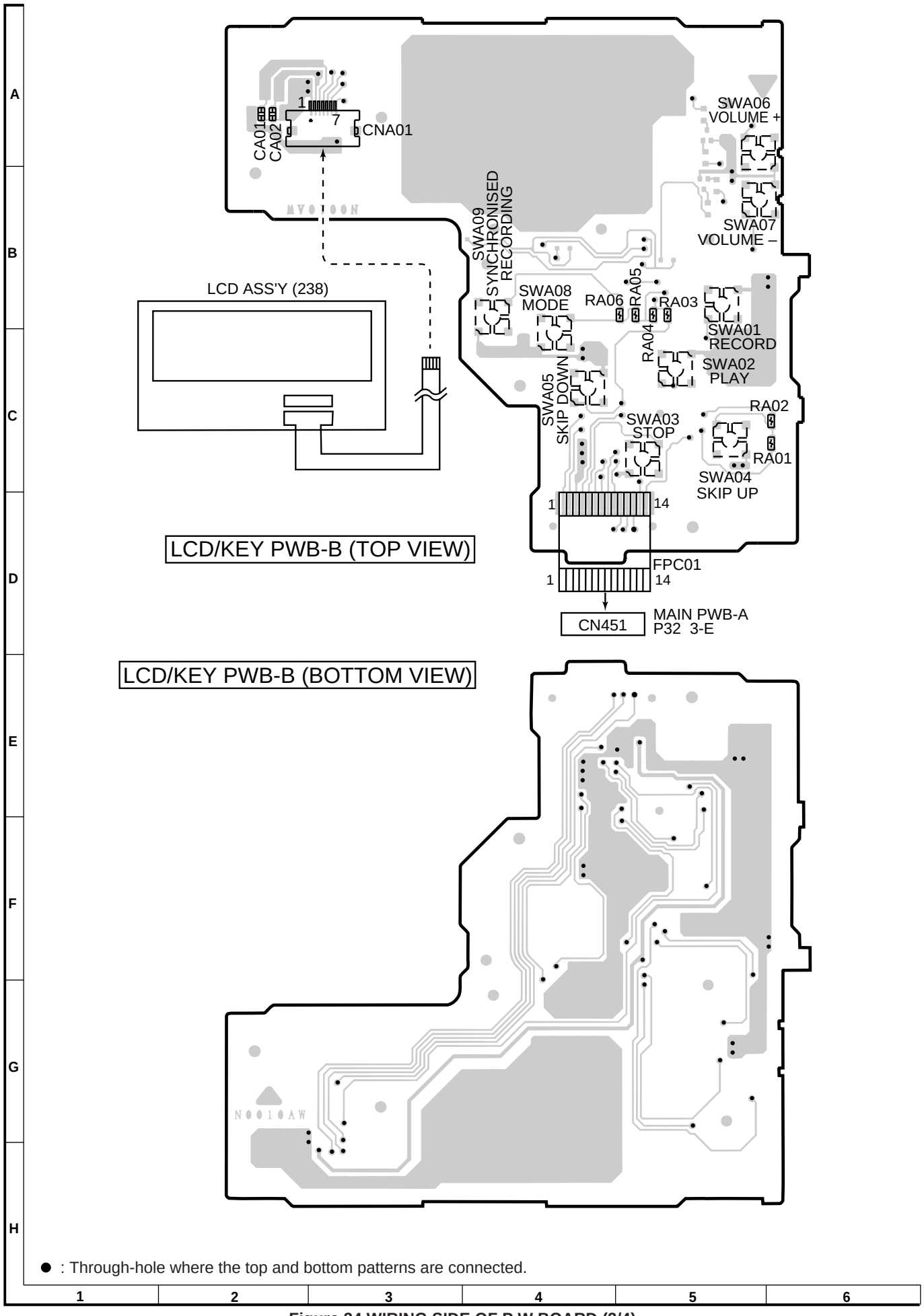
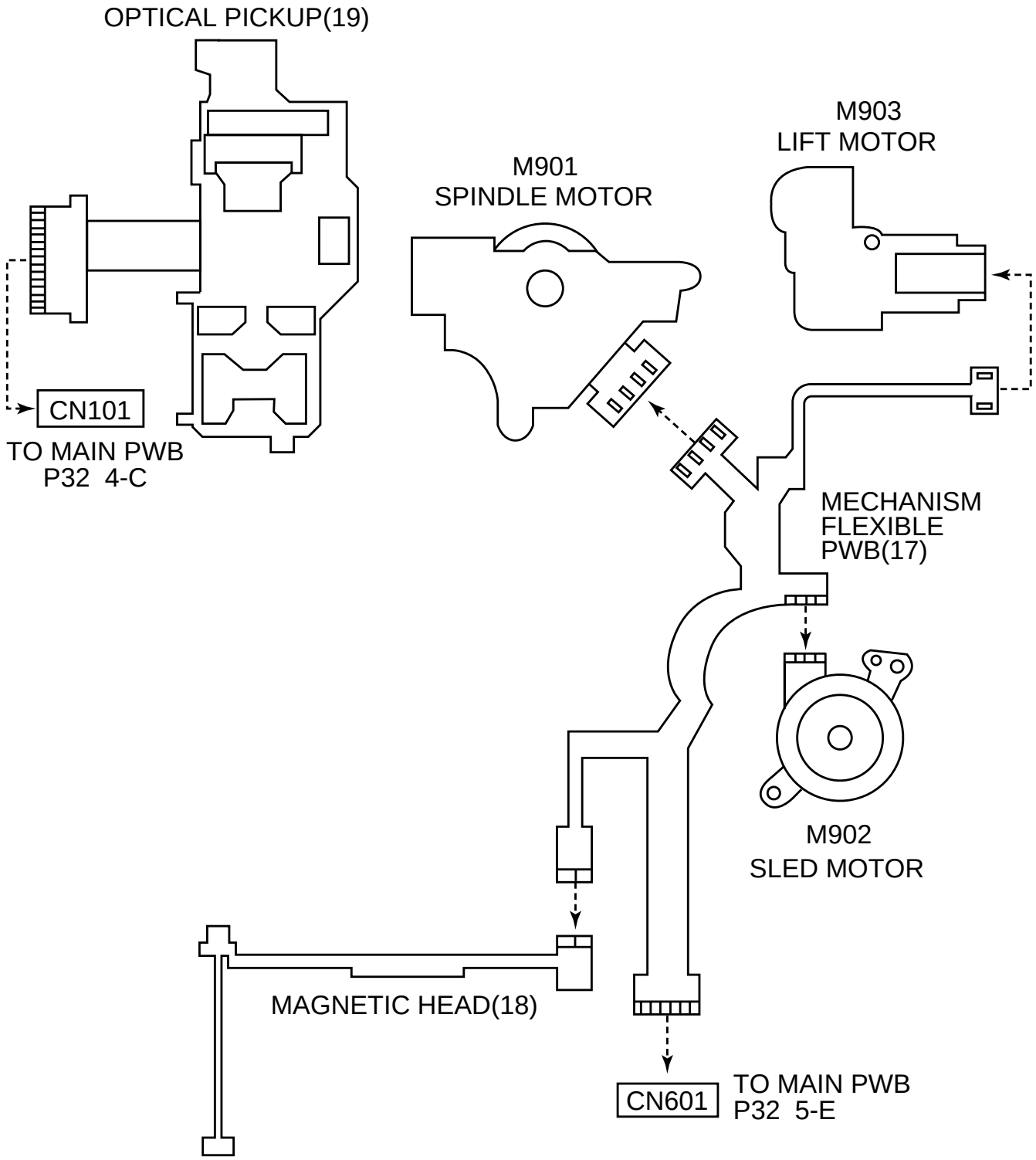


Figure 34 WIRING SIDE OF P.W.BOARD (3/4)



7	8	9	10	11	12

Figure 35 WIRING SIDE OF P.W.BOARD (4/4)

VOLTAGE

IC101	
PIN NO.	VOLTAGE
1	0.15 V
2	0.15 V
3	0.15 V
4	0.15 V
5	1.29 V
6	1.29 V
7	1.29 V
8	1.29 V
9	1.29 V
10	1.29 V
11	1.29 V
12	1.29 V
13	1.3 V
14	1.3 V
15	1.3 V
16	1.3 V
17	1.3 V
18	1.3 V
19	1.3 V
20	1.3 V
21	1.3 V
22	1.3 V
23	1.3 V
24	0.26 V
25	1.48 V
26	0.3 V
27	0 V
28	2.68 V
29	2.58 V
30	1.88 V
31	0 V
32	1.3 V
33	1.3 V
34	0.26 V
35	1.3 V
36	1.3 V
37	1.3 V
38	1.16 V
39	0.7 V
40	2.58 V
41	1.51 V
42	0 V
43	1.3 V
44	0.28 V
45	0.28 V
46	1.29 V
47	0.28 V
48	0.28 V

IC201			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	0.79 V	51	0 V
2	2.49 V	52	1 V
3	1.3 V	53	0 V
4	0 V	54	0 V
5	2.58 V	55	3.04 V
6	1.3 V	56	0 V
7	1.3 V	57	0 V
8	1 V	58	0 V
9	1.3 V	59	0 V
10	1.3 V	60	0 V
11	1.3 V	61	1.55 V
12	1.3 V	62	1.55 V
13	1.62 V	63	0 V
14	1.55 V	64	0 V
15	0 V	65	0 V
16	0 V	66	0 V
17	1.52 V	67	0 V
18	0 V	68	0 V
19	0 V	69	0 V
20	0 V	70	0 V
21	0 V	71	0 V
22	0 V	72	2.3 V
23	0 V	73	0 V
24	0 V	74	0 V
25	0 V	75	2.3 V
26	0.7 V	76	0 V
27	0.7 V	77	0 V
28	0.7 V	78	0 V
29	1.7 V	79	0 V
30	1.1 V	80	0 V
31	3.04 V	81	0 V
32	0.65 V	82	2.3 V
33	1.1 V	83	0 V
34	1.1 V	84	0 V
35	1.1 V	85	2.3 V
36	1.1 V	86	2.3 V
37	2.24 V	87	2.3 V
38	0 V	88	0 V
39	2.4 V	89	2.9 V
40	1.8 V	90	0.3 V
41	1.8 V	91	0.3 V
42	1.3 V	92	0.2 V
43	2.2 V	93	0.3 V
44	3 V	94	0.3 V
45	1.65 V	95	0.3 V
46	1.59 V	96	0.2 V
47	1.3 V	97	0.2 V
48	0 V	98	3 V
49	1.56 V	99	3 V
50	1.4 V	100	0 V

IC202	
PIN NO.	VOLTAGE
1	2.48 V
2	(1.4 V)
3	(1.5 V)
4	(2.4 V)
5	(1.8 V)
6	–
7	(1.0 V)
8	(1.3 V)
9	(0.5 V)
10	(0.5 V)
11	(0.5 V)
12	2.48 V
13	0 V
14	(0.5 V)
15	(0.8 V)
16	(0.8 V)
17	(0.8 V)
18	(0.8 V)
19	(1.0 V)
20	(1.8 V)
21	(1.9 V)
22	(1.5 V)
23	(1.5 V)
24	0 V

IC251	
PIN NO.	VOLTAGE
1	2.06 V
2	2.06 V
3	–
4	0 V

IC271	
PIN NO.	VOLTAGE
1	0 V
2	0 V
3	0.3 V
4	0 V
5	2.49 V

IC301			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	3.12 V	33	3.12 V
2	0 V	34	0 V
3	0 V	35	3.12 V
4	0 V	36	3.12 V
5	0 V	37	0 V
6	3.12 V	38	0 V
7	–	39	0 V
8	–	40	0 V
9	3.12 V	41	3.12 V
10	–	42	0 V
11	–	43	3.12 V
12	3.12 V	44	0 V
13	0 V	45	3.12 V
14	0 V	46	1.55 V
15	0 V	47	1.55 V
16	3.12 V	48	0 V
17	0 V	49	3.12 V
18	0 V	50	0 V
19	0 V	51	3.06 V
20	3.12 V	52	0 V
21	0 V	53	0 V
22	3.12 V	54	3.12 V
23	3.12 V	55	0 V
24	3.12 V	56	0.98 V
25	0 V	57	3.12 V
26	3.12 V	58	3.12 V
27	0 V	59	3.07 V
28	0 V	60	0 V
29	3.12 V	61	3.12 V
30	0 V	62	0 V
31	3.12 V	63	0 V
32	0 V	64	0 V

IC302	
PIN NO.	VOLTAGE
1	5 V
2	0 V
3	3.07 V
4	0 V
5	3.12 V

IC303	
PIN NO.	VOLTAGE
1	1.52 V
2	0 V
3	0 V
4	0 V
5	3.07 V

IC351	
PIN NO.	VOLTAGE
1	0 V
2	0 V
3	4.5 V
4	0 V
5	0 V
6	4.5 V
7	0 V
8	1.1 V
9	4.5 V
10	0 V
11	1.1 V
12	4.5 V
13	0 V
14	4.54 V

IC353	
PIN NO.	VOLTAGE
1	–
2	0 V
3	2.51 V
4	–
5	0 V
6	2.51 V

IC354	
PIN NO.	VOLTAGE
1	–
2	–
3	0 V
4	0 V
5	0 V

IC401			
PIN NO.	VOLTAGE	PIN NO.	VOLTAGE
1	3.06 V	61	0 V
2	0.1 V	62	3.07 V
3	3.07 V	63	3.07 V
4	0 V	64	0 V
5	3.07 V	65	3.07 V
6	0 V	66	0 V
7	3.07 V	67	0 V
8	0 V	68	0 V
9	3.07 V	69	0 V
10	3.07 V	70	0 V
11	0.6 V	71	3.04 V
12	0.7 V	72	0 V
13	–	73	2.83 V
14	–	74	0 V
15	0 V	75	3.08 V
16	–	76	3.08 V
17	–	77	1.3 V
18	0.2 V	78	1.38 V
19	0.1 V	79	0 V
20	2.08 V	80	3.04 V
21	2.72 V	81	3.07 V
22	3.09 V	82	3.06 V
23	3.09 V	83	3.02 V
24	0 V	84	0 V
25	3.07 V	85	0 V
26	3.01 V	86	0 V
27	3.07 V	87	0 V
28	0 V	88	0 V
29	3.11 V	89	0 V
30	3.04 V	90	0 V
31	3.04 V	91	0 V
32	3.04 V	92	0 V
33	3.07 V	93	3.07 V
34	3.07 V	94	3.07 V
35	0 V	95	3.07 V
36	3.06 V	96	1.47 V
37	3.02 V	97	2.78 V
38	0 V	98	2.52 V
39	0 V	99	0.63 V
40	3.07 V	100	0 V
41	0 V	101	1.13 V
42	0 V	102	1.43 V
43	0 V	103	0 V
44	0 V	104	0 V
45	0 V	105	3.09 V
46	0 V	106	0 V
47	0 V	107	3.08 V
48	0 V	108	0 V
49	3.07 V	109	3.08 V
50	0.16 V	110	0 V
51	0.17 V	111	0 V
52	0.16 V	112	3.09 V
53	0.35 V	113	3.09 V
54	0 V	114	3.09 V
55	3.05 V	115	3.02 V
56	0 V	116	0 V
57	2.59 V	117	0 V
58	3.02 V	118	3.07 V
59	0 V	119	0 V
60	0 V	120	0 V

IC402	
PIN NO.	VOLTAGE
1	0 V
2	2.46 V
3	0 V
4	0 V
5	2.46 V
6	0 V
7	2.46 V
8	2.46 V

IC651	
PIN NO.	VOLTAGE
1	2.51 V
2	0 V
3	0 V
4	0 V
5	–
6	1.17 V
7	1.17 V
8	0 V

IC404	
PIN NO.	VOLTAGE
1	2.49 V
2	0.25 V
3	0 V
4	2.24 V
5	2.49 V

IC431	
PIN NO.	VOLTAGE
1	2.47 V
2	2.47 V
3	–
4	0 V

IC501	
PIN NO.	VOLTAGE
1	0 V
2	0 V
3	0 V
4	0 V
5	2.79 V
6	0 V
7	0 V
8	0 V
9	0 V
10	1.52 V
11	1.53 V
12	1.53 V
13	0 V
14	0 V
15	–
16	–

IC601	
PIN NO.	VOLTAGE
1	0 V
2	0.42 V
3	1.52 V
4	4.72 V
5	1.56 V
6	7.8 V
7	1.56 V
8	9.29 V
9	0 V
10	0.34 V
11	0 V
12	0.34 V
13	0 V
14	0.36 V
15	0 V
16	0.46 V
17	0 V
18	0 V
19	0 V
20	3.4 V
21	3.4 V
22	3.4 V
23	0 V
24	0 V
25	0 V
26	3.03 V
27	2.1 V
28	0 V
29	0 V
30	0 V
31	2.1 V
32	0 V
33	0 V
34	0 V
35	0 V
36	0 V
37	0 V
38	0 V
39	0 V
40	2.1 V
41	0 V
42	0 V
43	0 V
44	0 V
45	2.1 V
46	0 V
47	0 V
48	0.8 V
49	2.87 V
50	1.05 V
51	3.09 V
52	0.83 V
53	0 V
54	3.12 V
55	3.12 V
56	0 V
57	0 V
58	0 V
59	0 V
60	0 V
61	0 V
62	0 V
63	0 V
64	0 V

NOTE1 : IC301 and IC302 are measured under the condition that USB is connected.

NOTE2 : Preform the measurement on the IC401 pin 36 in the TEST mode with GND short-circuited. (LCD is in "TEST" state.)

IC701	
PIN NO.	VOLTAGE
1	0 V
2	0 V
3	0 V
4	0 V
5	0 V
6	0 V
7	0 V
8	0 V
9	0 V
10	0 V
11	0 V
12	0 V
13	0 V
14	0 V
15	0 V
16	0 V
17	–2.76 V
18	0 V
19	0 V
20	2.73 V
21	0.89 V
22	0 V
23	0 V
24	0 V

IC703	
PIN NO.	VOLTAGE
1	0 V
2	0 V
3	0.8 V
4	0 V
5	0 V
6	1.79 V
7	1.78 V
8	0 V
9	1.78 V
10	0 V
11	0.9 V
12	0 V
13	2.36 V
14	0 V
15	0 V
16	1.79 V
17	0 V
18	–1.78 V
19	–1.78 V
20	0 V
21	0 V
22	0.78 V
23	0 V
24	0 V

IC771	
PIN NO.	VOLTAGE
1	2.49 V
2	0 V
3	2.46 V
4	–
5	2.3 V

IC801	
PIN NO.	VOLTAGE
1	1.87 V
2	1.95 V
3	–
4	0 V

IC821	
PIN NO.	VOLTAGE
D	1.2 V
S	0 V
G	0.4 V

IC822	
PIN NO.	VOLTAGE
1	1.24 V
2	2.49 V
3	0.2 V
4	0 V
5	1.15 V
6	1.13 V
7	1.12 V
8	1.26 V

IC841	
PIN NO.	VOLTAGE
1	2.04 V
2	2.49 V
3	–
4	0 V
5	(0.2 V)

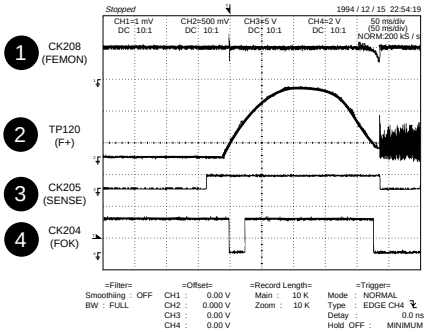
IC842	
PIN NO.	VOLTAGE
1	6.04 V
2	0 V
3	2.46 V
4	(–)
5	4.54 V

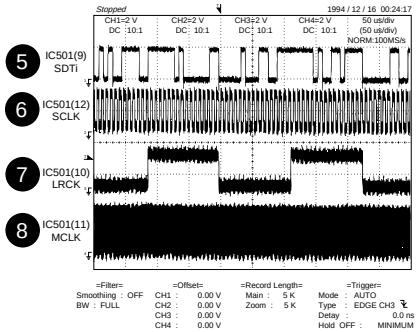
IC851	
PIN NO.	VOLTAGE
D	1.2 V
S	0 V
G	0.4 V

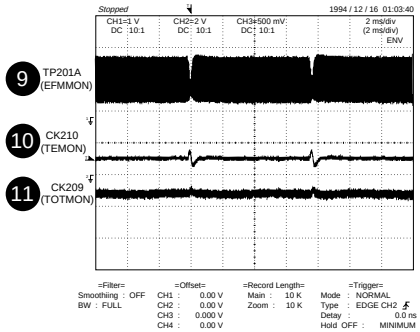
IC852	
PIN NO.	VOLTAGE
1	1.24 V
2	2.49 V
3	0.1 V
4	0 V
5	1.1 V
6	1.15 V
7	1.12 V
8	1.26 V

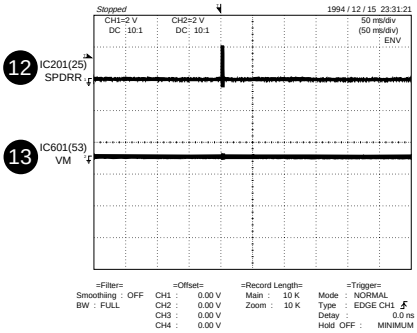
IC871	
PIN NO.	VOLTAGE
1	1.24 V
2	2.46 V
3	0 V
4	1.26 V
5	2.49 V

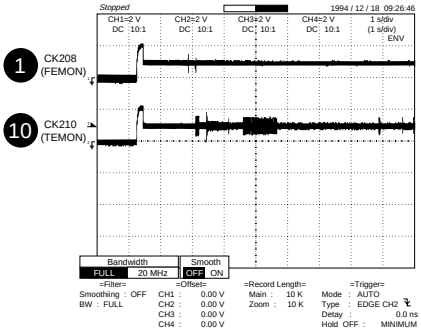
WAVEFORMS OF MD CIRCUIT

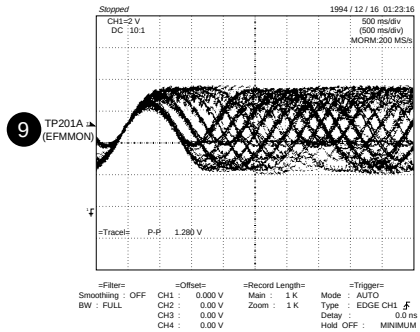


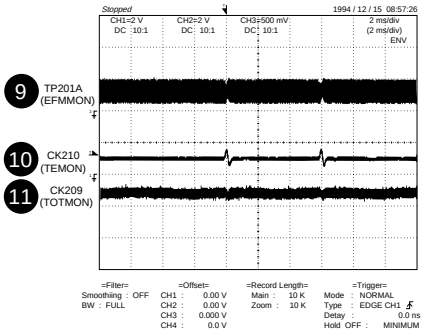


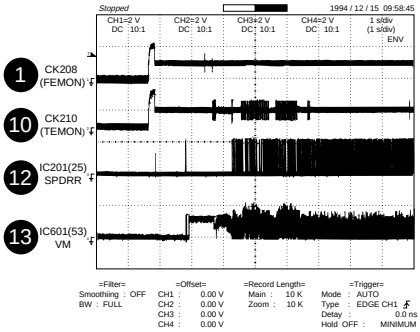


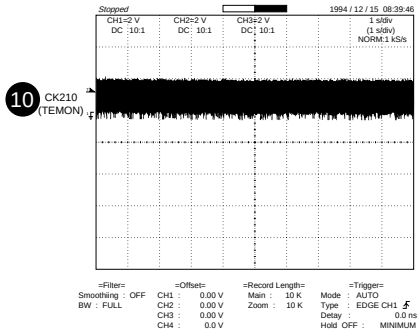


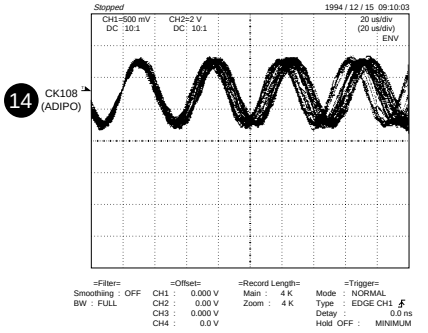


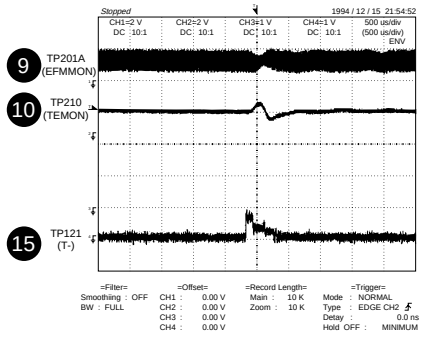




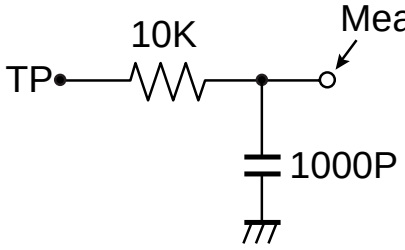






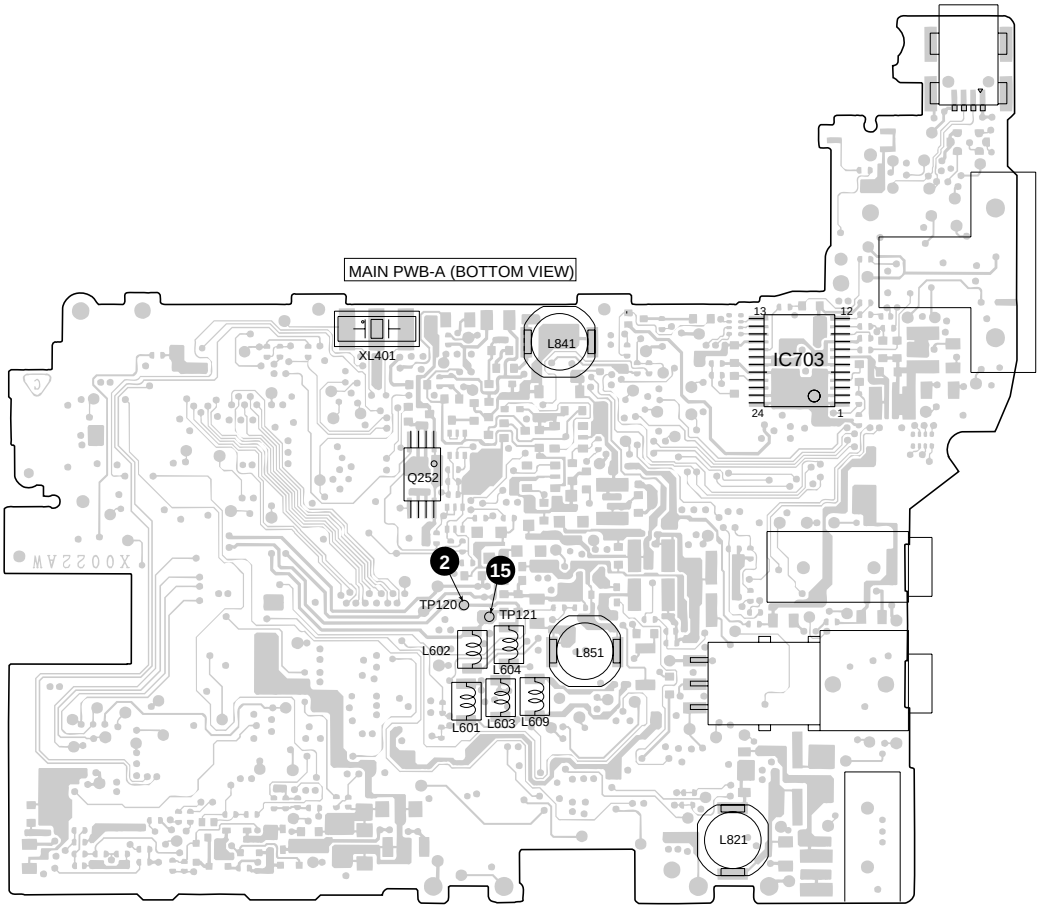


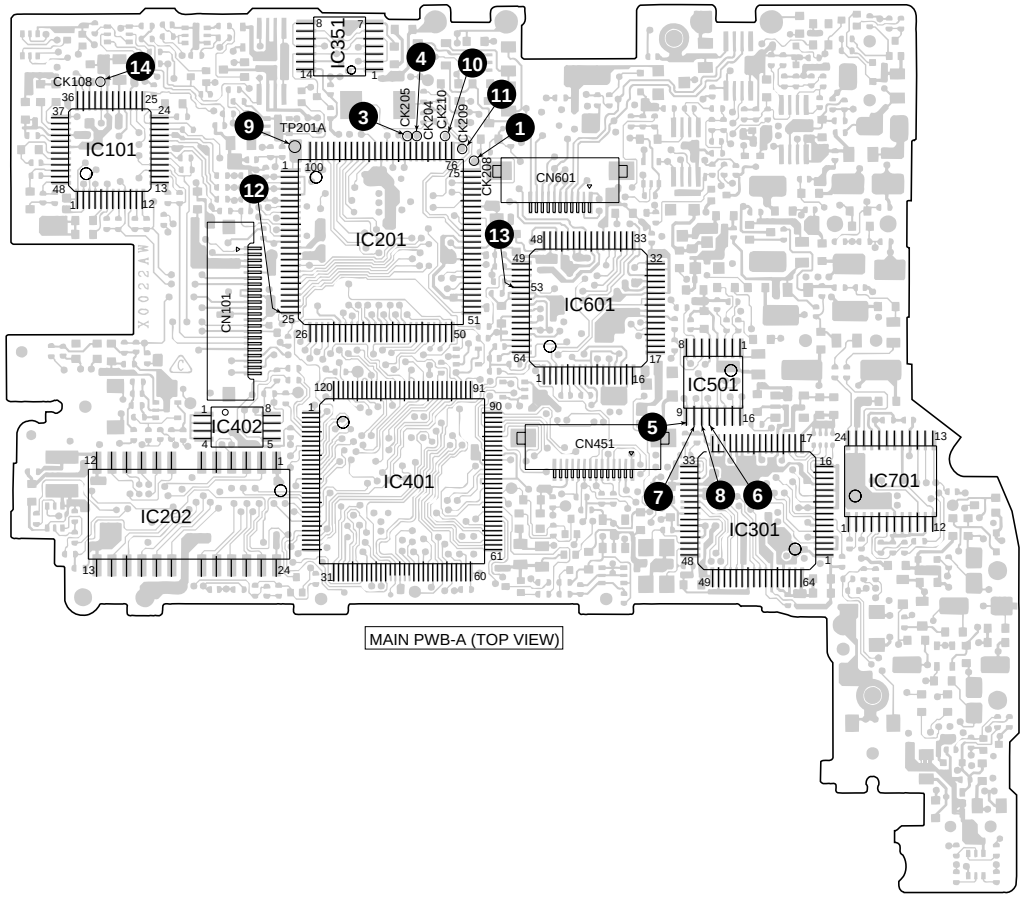
For TP208, CK209, and TP210, use the specific LPF, and observe the waveform.



When watching the EEM monitor (TP201A)
Set MSL from 00H to 80H with EEPROM control setting. After completion restore 00H.

WAVEFORMS POINTS





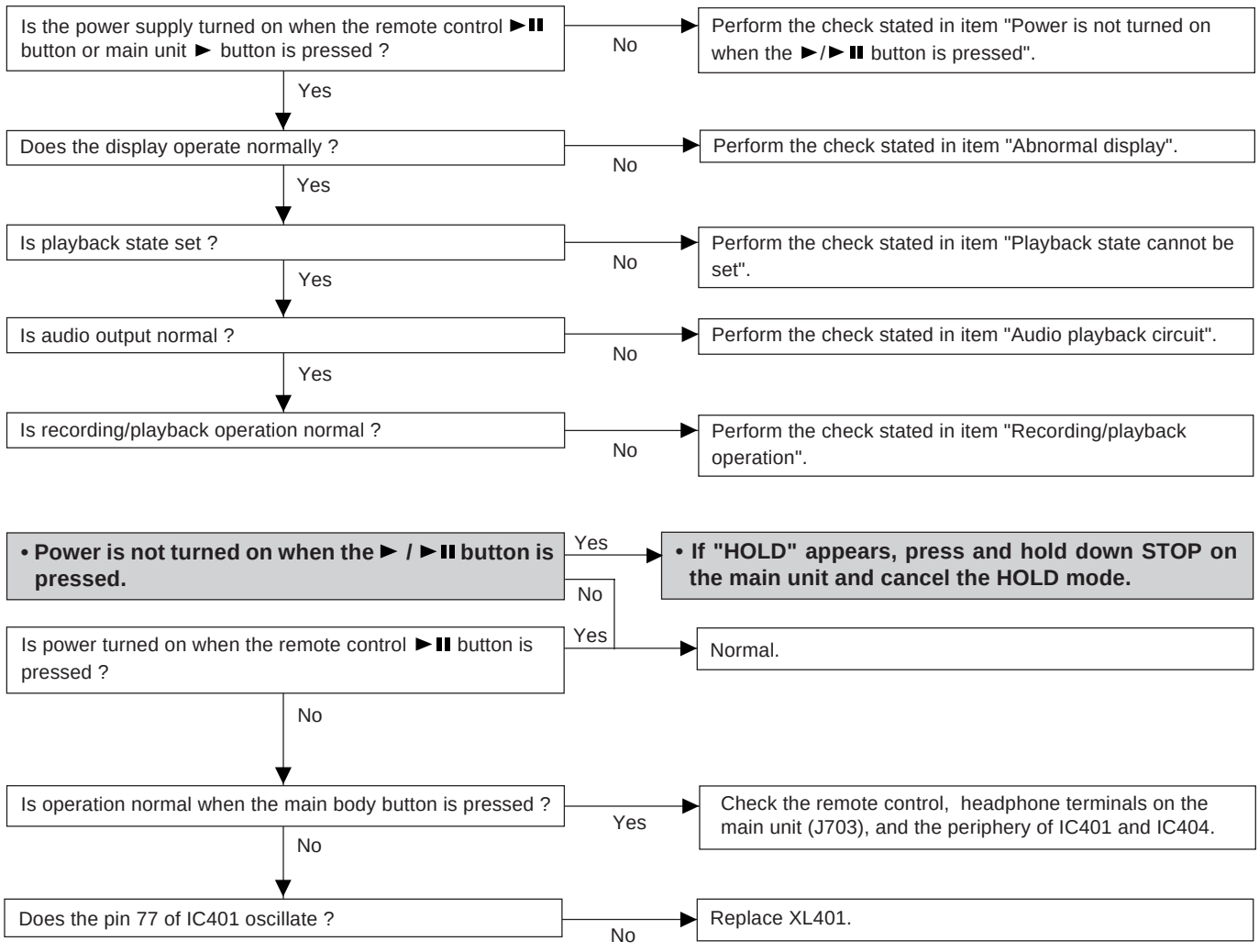
TROUBLESHOOTING

Use the test mode which indicates trouble causes before repairing the unit. This mode records maximum 10 past error causes as codes. Refer them for repairing.

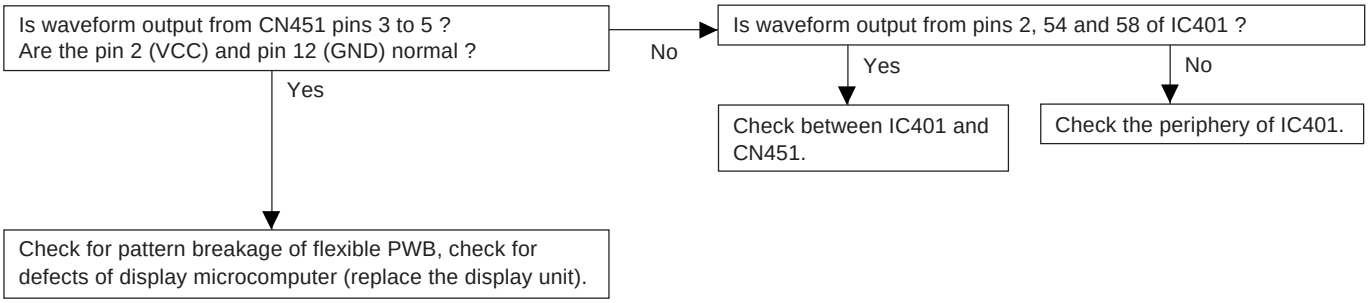
Preparations

If dusts and foreign materials are accumulated on the pickup lens, playback sounds can be skipped or the TOC (Table of Contans) can't be displayed. Clean the object lens and check the playback. When lens are dirty, do the following.
Turn off the power and wipe lens softly with a cleaning paper and a little marketing so as not to damage them.
Do not touch lens with bare hands.

If the unit doesn't work.
If the unit doesn't start after cleaning the pickup objects lens lens, check the unit as follows.

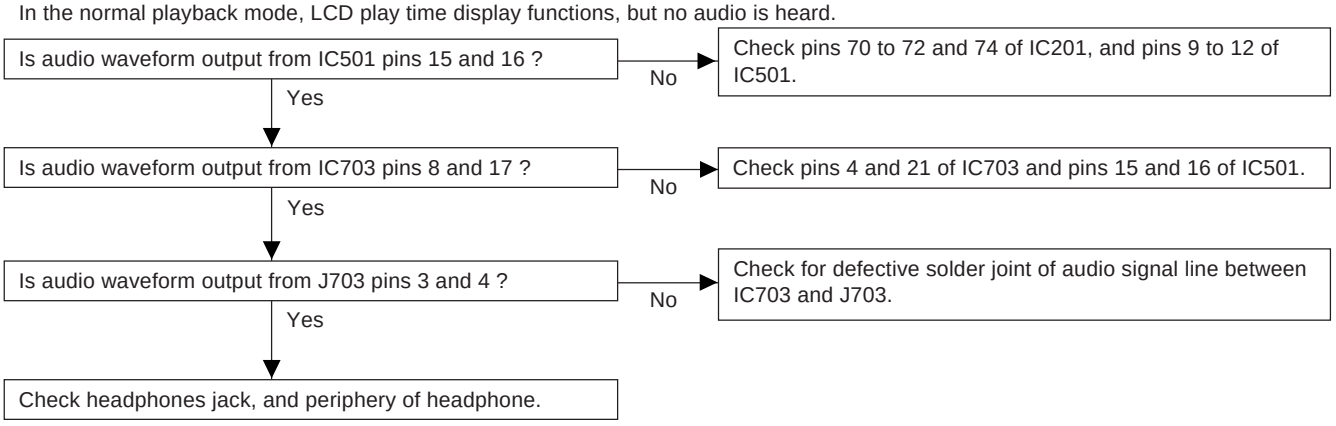

Is the power supply turned on when the remote control ►II button or main unit ► button is pressed ?
No
Perform the check stated in item "Power is not turned on when the ►/►II button is pressed".
Yes
Does the display operate normally ?
No
Perform the check stated in item "Abnormal display".
Yes
Is playback state set ?
No
Perform the check stated in item "Playback state cannot be set".
Yes
Is audio output normal ?
No
Perform the check stated in item "Audio playback circuit".
Yes
Is recording/playback operation normal ?
No
Perform the check stated in item "Recording/playback operation".
• Power is not turned on when the ► / ►II button is pressed.
Yes
• If "HOLD" appears, press and hold down STOP on the main unit and cancel the HOLD mode.
No
Is power turned on when the remote control ►II button is pressed ?
Yes
Normal.
No
Is operation normal when the main body button is pressed ?
Yes
Check the remote control, headphone terminals on the main unit (J703), and the periphery of IC401 and IC404.
No
Does the pin 77 of IC401 oscillate ?
No
Replace XL401.

• Abnormal display

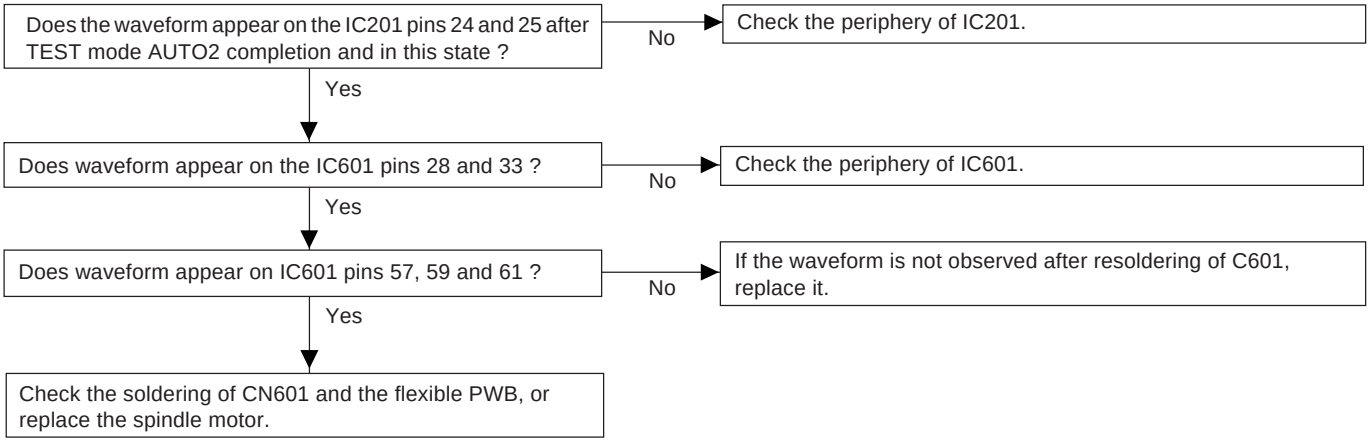

Is waveform output from CN451 pins 3 to 5 ?
Are the pin 2 (VCC) and pin 12 (GND) normal ?
No
Is waveform output from pins 2, 54 and 58 of IC401 ?
Yes
No
Yes
Check between IC401 and CN451.
Check the periphery of IC401.
Check for pattern breakage of flexible PWB, check for defects of display microcomputer (replace the display unit).

• Audio playback clrcult

In the normal playback mode, LCD play time display functions, but no audio is heard.

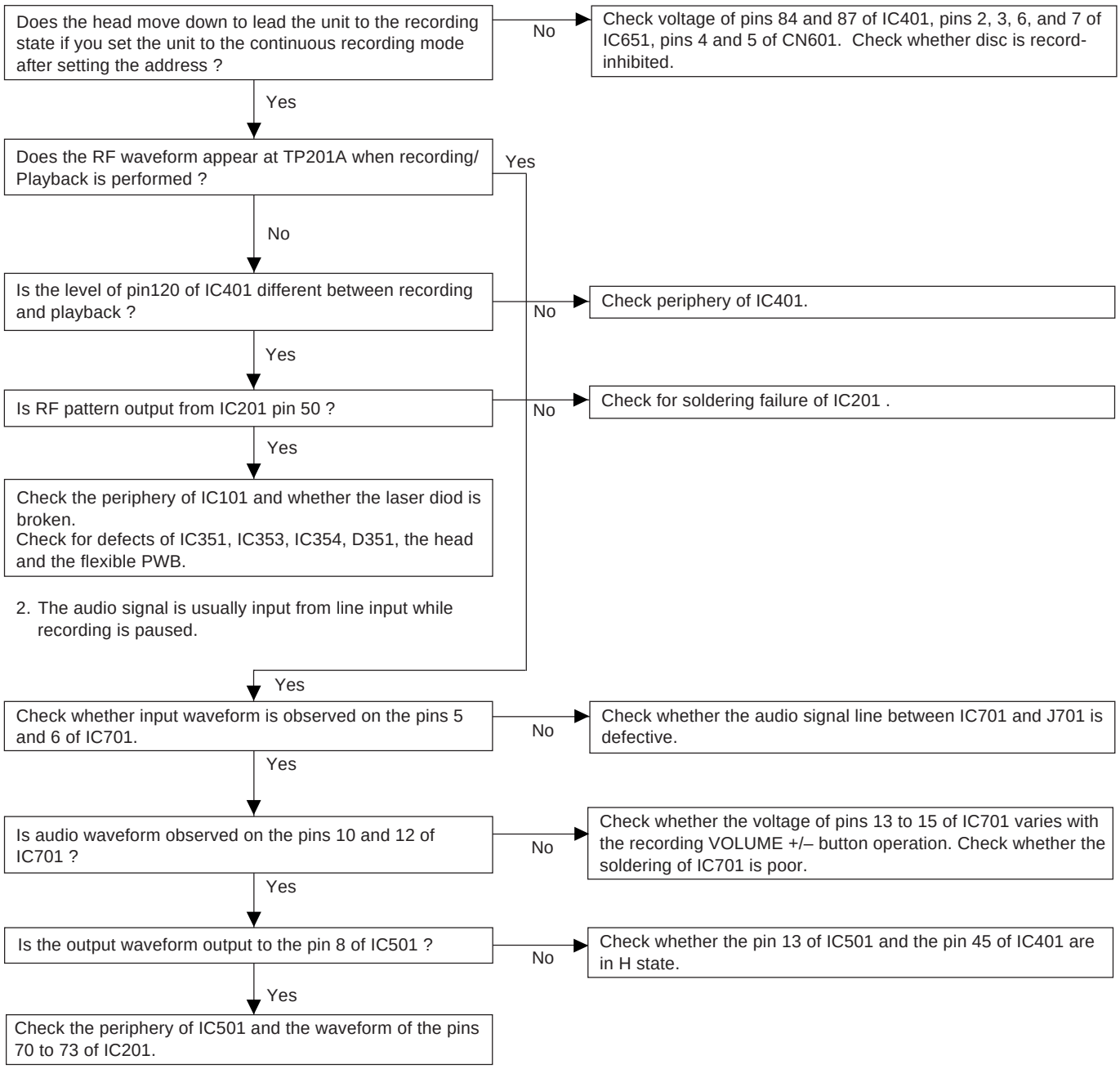

Is audio waveform output from IC501 pins 15 and 16 ?
No
Check pins 70 to 72 and 74 of IC201, and pins 9 to 12 of IC501.
Yes
Is audio waveform output from IC703 pins 8 and 17 ?
No
Check pins 4 and 21 of IC703 and pins 15 and 16 of IC501.
Yes
Is audio waveform output from J703 pins 3 and 4 ?
No
Check for defective solder joint of audio signal line between IC703 and J703.
Yes
Check headphones jack, and periphery of headphone.

• The spindle motor does not rotate.


Does the waveform appear on the IC201 pins 24 and 25 after TEST mode AUTO2 completion and in this state ?
No
Check the periphery of IC201.
Yes
Does waveform appear on the IC601 pins 28 and 33 ?
No
Check the periphery of IC601.
Yes
Does waveform appear on IC601 pins 57, 59 and 61 ?
No
If the waveform is not observed after resoldering of C601, replace it.
Yes
Check the soldering of CN601 and the flexible PWB, or replace the spindle motor.

• Recording/playback operation

1. Insert a low reflection disc, and ascertain audio output by normal playback, and then set TEST REC mode.
   Change MSL from 00H to 80H by the control setting of EEPROM. After completing the operation, return in to 00H.


Does the head move down to lead the unit to the recording state if you set the unit to the continuous recording mode after setting the address ?
No
Check voltage of pins 84 and 87 of IC401, pins 2, 3, 6, and 7 of IC651, pins 4 and 5 of CN601. Check whether disc is record-inhibited.
Yes
Does the RF waveform appear at TP201A when recording/ Playback is performed ?
Yes
No
Is the level of pin120 of IC401 different between recording and playback ?
No
Check periphery of IC401.
Yes
Is RF pattern output from IC201 pin 50 ?
No
Check for soldering failure of IC201 .
Yes
Check the periphery of IC101 and whether the laser diod is broken.
Check for defects of IC351, IC353, IC354, D351, the head and the flexible PWB.

2. The audio signal is usually input from line input while recording is paused.

Yes
Check whether input waveform is observed on the pins 5 and 6 of IC701.
No
Check whether the audio signal line between IC701 and J701 is defective.
Yes
Is audio waveform observed on the pins 10 and 12 of IC701 ?
No
Check whether the voltage of pins 13 to 15 of IC701 varies with the recording VOLUME +/– button operation. Check whether the soldering of IC701 is poor.
Yes
Is the output waveform output to the pin 8 of IC501 ?
No
Check whether the pin 13 of IC501 and the pin 45 of IC401 are in H state.
Yes
Check the periphery of IC501 and the waveform of the pins 70 to 73 of IC201.

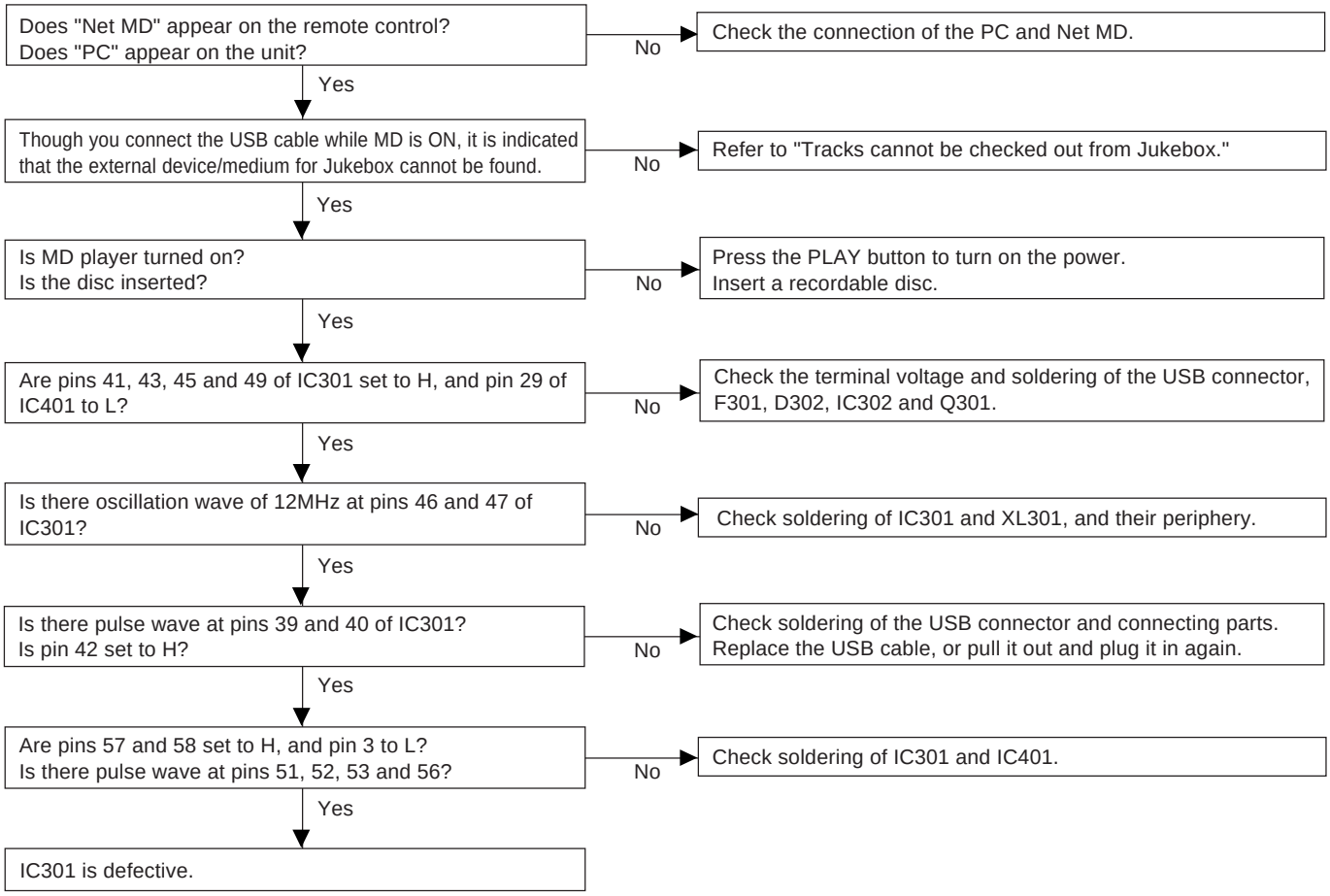
TROUBLESHOOTING FOR NET MD

After checking that recording and playback are normally operated on this unit, try the check-in/check-out operation.

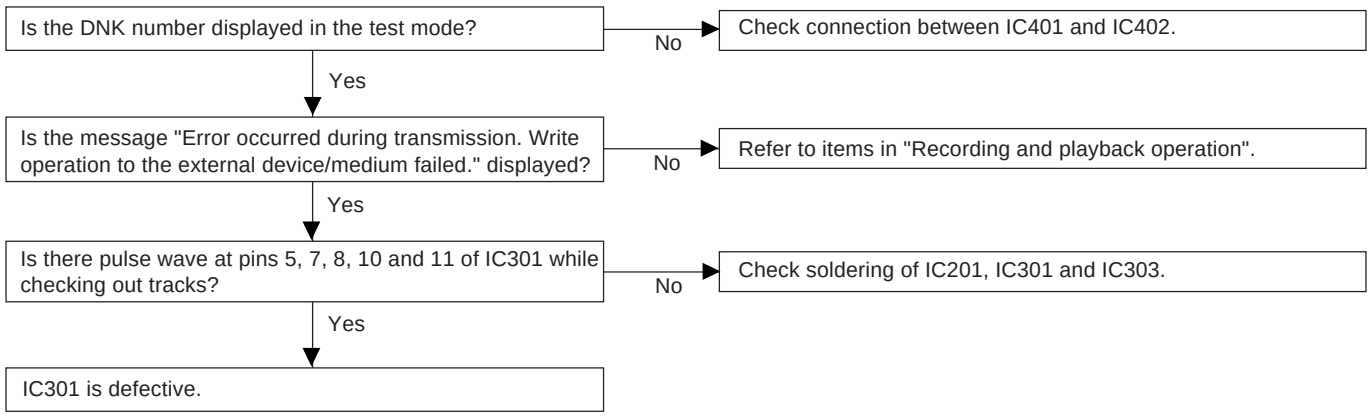
Preparations

After checking "Necessary system configurations" described in the service manual, install Jukebox according to "Software installation" and "PC connection". After completing the installation, start Jukebox.
Insert a recordable MD and turn on the power.

• Jukebox does not recognize Net MD


Does "Net MD" appear on the remote control?
Does "PC" appear on the unit?
No
Check the connection of the PC and Net MD.
Yes
Though you connect the USB cable while MD is ON, it is indicated that the external device/medium for Jukebox cannot be found.
No
Refer to "Tracks cannot be checked out from Jukebox."
Yes
Is MD player turned on?
Is the disc inserted?
No
Press the PLAY button to turn on the power.
Insert a recordable disc.
Yes
Are pins 41, 43, 45 and 49 of IC301 set to H, and pin 29 of IC401 to L?
No
Check the terminal voltage and soldering of the USB connector, F301, D302, IC302 and Q301.
Yes
Is there oscillation wave of 12MHz at pins 46 and 47 of IC301?
No
Check soldering of IC301 and XL301, and their periphery.
Yes
Is there pulse wave at pins 39 and 40 of IC301?
Is pin 42 set to H?
No
Check soldering of the USB connector and connecting parts.
Replace the USB cable, or pull it out and plug it in again.
Yes
Are pins 57 and 58 set to H, and pin 3 to L?
Is there pulse wave at pins 51, 52, 53 and 56?
No
Check soldering of IC301 and IC401.
Yes
IC301 is defective.

• Tracks cannot be checked out from Jukebox


Is the DNK number displayed in the test mode?
No
Check connection between IC401 and IC402.
Yes
Is the message "Error occurred during transmission. Write operation to the external device/medium failed." displayed?
No
Refer to items in "Recording and playback operation".
Yes
Is there pulse wave at pins 5, 7, 8, 10 and 11 of IC301 while checking out tracks?
No
Check soldering of IC201, IC301 and IC303.
Yes
IC301 is defective.

PROCEDURES FOR CONNECTION TO A NET MD PLAYER

● Connect the USB cable.

All the connection of the PC should be made and its power should be turned on.
The player should be turned on (the indicator lights up).

(1) Checking the connection of the USB cable.
If the microcomputer Vbas input is in the L state for approx. 1.5 seconds, the USB connection is recognized.
If DNK information from EEPROM is not read properly, the connection is not recognized.
If the following errors occur, subsequent procedures are not performed.
(Power abnormal, temperature rise, EEPROM error, battery exhaustion)

(2) Activating the security chip RESET output from the microcomputer = H

(3) Program download to the security chip.
The operation program (stored in the microcomputer built-in ROM) is written via the serial communication by CPU_CS, CPU_SO and CPU_SCK output.

(4) Writing the DNK information into the security chip.
DNK information stored in EEPROM is written via the serial communication by CPU_CS, CPU_SO and CPU_SCK output.

(5) Waiting for reception from the PC.
The status of the security chip is checked via the serial communication by CPU_SC, CPU_SO, CPU_SCK and CPU_SI.

(6) When valid command is received, the player recognizes the connection is made.
"Net MD" appears.

● If the "microcomputer Vbas input = H" state is detected, USB disconnection is recognized.

● If DNK information stored in EEPROM is not valid, check-in/check-out is impossible. (Playback, name creating, etc. can be performed.)

FUNCTION TABLE OF IC

IC401 RH-iX2992AFZZ : System Microcomputer (IX2992AF) (1/3)

Pin No.	Port Name	Terminal Name	Input/Output	Function
1	VCC	VCC	—	Positive power supply
2	PC0	DSPSTB	Output	Main unit display strobe output
3	PC1	EEPD	Input/Output	EEPROM serial data input/output
4	PC2	EEPK	Output	EEPROM serial clock output
5	PC3	EPRT	Output	EEPROM write protect control output
6	VSS	VSS	—	Ground potential
7	PC4	PCNT1	Output	System power ON/OFF control output
8	PC5	SYRS	Output	System LSI register selection output
9	PC6	SYRD	Output	System LSI read enable output
10	PC7	SYWR	Output	System LSI write enable output
11-14	PB0-3	SYD0-3	Input/Output	System LSI parallel data bus
15	VSS	VSS	—	Ground potential
16-19	PB4-7	SYD4-7	Input/Output	System LSI parallel data bus
20	PA0	ELON	Output	EL ON control output
21	PA1	MCPGI	Input	Microcomputer plug insert detection input
22	PA2	INPGI	Input	Line/digital plug insert detection
23	PA3	INPGCK	Input	Line/digital plug type detection
24	VSS	VSS	—	Ground potential
25	PA4/IRQ4	STOP	Input	Detection input for main unit STOP button operation
26	PA5/IRQ5	ARQD	Input	Disc lid open/close detection/Startup requirement
27	PA6/IRQ6	RPLRC	Input	Detection input for remote control PLAY/REC button operation
28	PA7/IRQ7	DCEXT	Input	DC IN detection (level)
29	IRQ3	Vbas	Input	Vbas detection (security chip)
30	IRQ2	DINT	Input	System LSI interruption
31	P65/IRQ1	PLAY	Input	Detection input for main unit PLAY button operation
32	P64/IRQ0	REC	Input	Detection input for main unit REC button
33	VCC	VCC	—	Positive power supply
34	PE0	RCPCNT	Output	Recording circuit power control output
35	PE1	RCLAT	Output	Output for recording audio IC data latch
36*	PE2	TEST0	Input	Test mode setting input
37	PE3	JPNP	Input	Japanese phonetic conversion/input presence identification
38	VSS	VSS	—	Ground potential
39	PE4	OPICGA	Output	P.U detection sensitivity switch output
40	PE5	RFPCNT	Output	RF-LSI power ON/OFF control output
41	PE6	SGAIN	Input/Output	RF amp gain switch output
42	PE7	DISCP	Input/Output	Output for RF amp TE polarity switch
43	PD0	OPTCNT	Output	Control for optical digital input circuit ON/OFF
44	PD1	DAPON	Output	D/A converter operation control output
45	PD2	ADPON	Output	A/D converter operation control output
46	PD3	RACLK	Output	Audio IC data clock output
47	VSS	VSS	—	Ground polarity
48	PD4	RADAT	Output	Audio IC serial data output
49	PD5	PBOPON	Output	Audio IC output level control output
50	PD6	PCNT4	Output	System power control output 4
51	PD7	DSPINH	Output	Prohibition control for main unit LCD driver display
52	VCC	VCC	—	Positive power supply
53	TXD0	RMDAT	Output	Remote control display data
54	TXD1	DSPDAT	Output	Main unit display data output
55	RXD0	PCILD	Output	PC link data input
56	P33	CHGCNT	Output	Charging control

In this unit, the terminal with asterisk mark (*) is open terminal which is not connected to the outside.

IC401 RH-iX2992AFZZ : System Microcomputer (IX2992AF) (2/3)

Pin No.	Port Name	Terminal Name	Input/Output	Function
57*	SCK0	SCK0	Output	Serial clock output (unused)
58	SCK1	DSPSCK	Output	Output for main unit display data clock
59	VSS	VSS	—	Ground potential
60	P60	DISCPR	Input	Disc recording prohibition switch input
61	P61	SLCNT3	Output	Stepping motor drive output 3
62	P62	SLCNT2	Output	Stepping motor drive output 2
63	P63	SLCNT1	Output	Stepping motor drive output 1
64	P27	SENSE	Input	System LSI servo sense input
65	P26	PBLAT	Output	Audio IC data latch output
66*	TIOCB4	MCMON	Output	Internal operation state monitor
67	P24	LEDONG	Output	LED ON control (green)
68	P23	LEDONB	Output	LED ON control (blue)
69	TIOCC3	BUZOUT	Output	Beep sound pulse output
70	P21	LEDONR	Output	LED ON control (red)
71	P20	FOK	Input	Focus OK signal input
72	FWE	FWE	Input	Flash write enable
73	RES	RESET	Input	Microcomputer hard reset input
74	NMI	DCIN	Input	DC IN edge detection
75	STBY	STBY	Input	Microcomputer standby input (unused)
76	VCC	VCC	—	Positive power supply
77	XTAL	XTAL	—	Crystal oscillator connection terminal
78	EXTAL	EXTAL	—	Crystal oscillator connection terminal
79	VSS	VSS	—	Ground potential
80	PF7	EJSW	Input	Eject lever operation detection input
81	VCC	VCC	—	Positive power supply
82	PF6	DCNT	Output	Mechanism driver enable output
83	PF5	JACKIN	Input	DC input plug insert detection
84	PF4	LDCNTD	Output	Recording head elevating control output D
85	PF3	PLL_SW	Output	Security chip PLL SW
86	PF2	RESET	Output	Security chip RESET
87	PF1	LDCNTU	Output	Recording head elevating control output U
88	PF0	CPU_CS	Output	Security chip CS
89	TXD2	CPU_SO	Output	Security chip data output
90	RXD2	CPU_SI	Input	Security chip data input
91	SCK2	CPU_SCK	Output	Security chip clock output
92	IRQ7	CPU_INT	Input	Security chip interruption
93	AVCC	AVCC	—	A/D.D/A converter positive power supply
94	VREF	VREF	—	A/D.D/A converter reference voltage
95	AN0	PL_RC	Input	Remote control key (RPLRC) input identification
96	AN1	TEMP	Input	Ambient temperature detection input
97	AN2	HKEY1	Input	Main unit key operation detection input 1
98	AN3	RKEY	Input	Remote control key operation detection input
99	AN4	PLVDCI	Input	DC IN voltage (abnormal) detection input
100	AN5	PLVBAT	Input	Power supply voltage detection input
101	DA0	LDVAR	Output	P.U. laser power setting output
102	DA1	VLCD	Output	Main unit LCD contrast control output
103	AVSS	AVSS	—	A/D.D/A converter ground potential
104	VSS	VSS	—	Ground potential
105	P17	PCNT3	Output	_DC IN input control output
106	P16	BATON	Output	Battery power supply line ON/OFF
107	P15	DCON	Output	DC power supply line ON/OFF

In this unit, the terminal with asterisk mark (*) is open terminal which is not connected to the outside.

IC401 RH-iX2992AFZZ : System Microcomputer (IX2992AF) (3/3)

Pin No.	Port Name	Terminal Name	Input/Output	Function
108	P14	DFCKC	Output	Security IC clock input ON/OFF
109	TCLKB	SPIN	Input	Input for spindle motor FG pulse detection
110	TCLKA	CIN	Input	Track cross signal/focus drive detection
111	P11	LDON	Output	P.U. laser ON/OFF control output
112	P10	PCNT2	Output	Power ON Tr ON/OFF
113	MD0	MD0	Input	Operation mode selection input 0
114	MD1	MD1	Input	Operation mode selection input 1
115	MD2	MD2	Input	Operation mode selection input 2
116	PG0	EMPH1	Output	Audio emphasis control output 1
117	PG1	EMPH0	Output	Audio output emphasis control 0
118	PG2	XRST	Output	System LSI hard reset output
119*	PG3	CKSTP	Output	Microcomputer operation monitor output
120	PG4	HDON	Output	Output for recording head electrical current control

In this unit, the terminal with asterisk mark (*) is open terminal which is not connected to the outside.

— MEMO —

SHARP PARTS GUIDE

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"HOW TO ORDER REPLACEMENT PARTS"

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1. MODEL NUMBER
2. REF. No.
3. PART NO.
4. DESCRIPTION

★ MARK: SPARE PARTS-DELIVERY SECTION

For U.S.A. only

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For location of SHARP Parts Distributor,
Please call Toll-Free;
1-800-BE-SHARP

Explanation of capacitors/resistors parts codes

Capacitors

VCC ..... Ceramic type
VCK..... Ceramic type
VCT ..... Semiconductor type
VC • • MF ..... Cylindrical type (without lead wire)
VC • • MN..... Cylindrical type (without lead wire)
VC • • TV..... Square type (without lead wire)
VC • • TQ ..... Square type (without lead wire)
VC • • CY ..... Square type (without lead wire)
VC • • CZ ..... Square type (without lead wire)
VC • • • • • • • • • J .. The 13th character represents capacity difference.
("J" ±5%, "K" ±10%, "M" ±20%, "N" ±30%,
"C" ±0.25 pF, "D" ±0.5 pF, "Z" +80-20%.)

If there are no indications for the electrolytic capacitors, error is ±20%.

Resistors

VRD ..... Carbon-film type
VRS..... Carbon-film type
VRN ..... Metal-film type
VR • • MF ..... Cylindrical type (without lead wire)
VR • • MN..... Cylindrical type (without lead wire)
VR • • TV..... Square type (without lead wire)
VR • • TQ ..... Square type (without lead wire)
VR • • CY ..... Square type (without lead wire)
VR • • CZ ..... Square type (without lead wire)
VR • • • • • • • • • J .. The 13th character represents error.
("J" ±5%, "F" ±1%, "D" ±0.5%.)

If there are no indications for other parts, the resistors are ±5% carbon-film type.

NOTE:
Parts marked with "⚠" are important for maintaining the safety of the set.
Be sure to replace parts with specified ones for maintaining the safety and performance of the set.

NO.	PART CODE	★	PRICE RANK	DESCRIPTION
INTEGRATED CIRCUITS				
IC101	VHIIR3R58M/-1	J	AM	RF Signal Processor,IR3R58M
IC201	VHILR37818+-1	J	BL	Endec/Servo/Atrac,LR37818
IC202	RH-IX2960AFZZ	J	BB	16M Bit D-RAM,IX2960AF
IC251	VHIS80808LN-1	J	AE	Reset,S80808LN
IC271	VHIS89110AC-1	J	AH	OP Amp.,S89110AC
IC301	VHICXD1873A-1	J	BN	Security Tip IC,CXD1873A
IC302	VHI6204B31M-1	J	AF	3.1V Regulator,6204B31M
IC303	VHITC7SH08U-1	J	AE	Gate IC,TC7SH08FU
IC351	VHI74ACT02T-1	J	AE	Head Driver,74ACT02T
IC353	VSMCH6616++-1	J	AG	Head Driver,MCH6616
IC354	VHICPH5608/-1	J	AH	Head Driver,CPH5608
IC401	RH-IX2992AFZZ	J	BS	System Microcomputer, IX2992AF
IC402	RH-IX2988AFZZ	J	AM	EEPROM,Authentication ID Written,IX2988AF
IC404	VHIT7SZ00FU-1	J	AF	Gate IC,T7SZ00FU
IC431	VHIS80824LN-1	J	AE	Reset,S80824LN
IC501	VHIAK4551VT-1	J	AU	AD/DA Converter,AK4551VT
IC601	VHIBD6606KV-1	J	BB	Motor Driver,BD6606KV
IC651	VHILB1938T+-1	J	AL	Motor Driver,LB1938T
IC701	VHIIR3R54N/-1	J	AQ	Audio Amp.,IR3R54N
IC703	VHIIR3R59N/-1	J	AN	Audio Amp.,IR3R59N
IC771	VHI6204B28M-1	J	AF	2.8 V Regulator,6204B28M
IC801	VHIS80811LN-1	J	AE	Reset,S80811LN
IC821	VSMCH3409++-1	J	AF	N-ch MOS FET,MCH3409
IC822	VHIIR3M14N/-1	J	AK	DC/DC Converter,IR3M14N
IC841	VHIS8328B31-1	J	AK	3.1 V UP Converter,S8328B31
IC842	VHI6204B45M-1	J	AF	4.5 V Regulator,6204B45M
IC851	VSMCH3409++-1	J	AF	N-ch MOS FET,MCH3409
IC852	VHIIR3M14N/-1	J	AK	DC/DC Converter,IR3M14N
IC871	VHITC7S86FU-1	J	AE	Exclusive or Gate,TC7S86FU
TRANSISTORS				
Q251	VS2SA17457/-1	J	AB	Silicon,PNP,2SA17457
Q252	VSFTD2017++-1	J	AL	N-ch MOS FET,FTD2017
Q253	VSXP04313++-1	J	AC	Power Select Charge Drive, XP04313
Q254	VS2SB1462J+-1	J	AC	Silicon,PNP,2SB1462 J
Q261	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q301	VS2SC4617R/-1	J	AB	Silicon,NPN,2SC4617 R
Q442	VS2SC4617R/-1	J	AB	Silicon,NPN,2SC4617 R
Q443	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q451	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q452	VS2SB1462J+-1	J	AC	Silicon,PNP,2SB1462 J
Q493	VS2SB1462J+-1	J	AC	Silicon,PNP,2SB1462 J
Q711	VS2SC4617R/-1	J	AB	Silicon,NPN,2SC4617 R
Q721	VS2SD2351W/-1	J	AC	Silicon,NPN,2SD2351 W
Q801	VSFTD2017++-1	J	AL	N-ch MOS FET,FTD2017
Q803	VS2SA17457/-1	J	AB	Silicon,PNP,2SA17457
Q804	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q805	VS2SB1462J+-1	J	AC	Silicon,PNP,2SB1462 J
Q806,807	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q809,810	VS2SB1462J+-1	J	AC	Silicon,PNP,2SB1462 J
Q821	VSXP04501++-1	J	AC	Power Transistor,XP04501
Q825	VSRT1N441U/-1	J	AB	Digital,NPN,RT1N441 U
Q841	VSMCH3409++-1	J	AF	N-ch MOS FET,MCH3409
Q842	VSRT1N441U/-1	J	AB	Digital,NPN,RT1N441 U
Q843	VSSSM6J08FU-1	J	AF	P-ch MOS FET,SSM6J08 FU
Q901	VSRT1N441U/-1	J	AB	Digital,NPN,RT1N441 U
DIODES				
D301	VHE15AZ6R2Y-1	J	AC	Zener,6.2V,15AZ6.2Y
D302	VHDRB520S30-1	J	AC	Schottky,RB520S30
D351	VHDSBE803//-1	J	AD	Silicon,SBE803
D431	VHDMA132WK/-1	J	AB	Silicon,MA132WK
D432	VHD1SS302//-1	J	AB	Silicon,1SS302
D491	VHE015Z5R1Y-1	J	AD	Zener,5.1V,015Z5.1Y
D492	VHE15AZ7R5Y-1	J	AC	Zener,7.5V,15AZ7.5Y
D493	VHE015Z5R1Y-1	J	AD	Zener,5.1V,015Z5.1Y
D494	VHE15AZ7R5Y-1	J	AC	Zener,7.5V,15AZ7.5Y
D495,496	VHEMA8075M/-1	J	AC	Zener,MA8075M
D651	VHDF10J2E//-1	J	AC	Silicon,F10J2E
D771,772	VHDF10J2E//-1	J	AC	Silicon,F10J2E
D800,801	VHD1SS388++-1	J	AC	Silicon,1SS388
D802,803	VHD1SS389//-1	J	AB	Silicon,1SS389
D805,806	VHD1SS388++-1	J	AC	Silicon,1SS388
D821	VHDFS1J2EA/-1	J	AC	Silicon,FS1J2EA

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
D841	VHDFS1J2EA/-1	J	AC	Silicon,FS1J2EA
D842	VHDHRB0103B-1	J	AC	Silicon,HRB0103B
D843	VHD1SS372//-1	J	AD	Silicon,1SS372
D851,852	VHDF10J2E//-1	J	AC	Silicon,F10J2E
D861,862	VHDF10J2E//-1	J	AC	Silicon,F10J2E
D891~893	VHE015Z5R1Y-1	J	AD	Zener,015Z5.1Y
LED301	VHPCL321CD+-1	J		LED,CL321CD
COILS				
B301	RCILZ0027AWZZ	J	AD	100 MHz,Tip Impeder
B303,304	RCILC0352AFZZ	J	AB	Tip Impeder,150mA
L100	VPBNN100K0000	J	AC	10 µH
L103	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L171	RCILC0356AFZZ	J	AC	10 µH
L202	VPBNN100K0000	J	AC	10 µH
L204	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L401	VPCBM101K0000	J	AC	100 µH
L452	RCILC0352AFZZ	J	AB	Tip Impeder,150mA
L453,454	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L456	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L457	RCILC0290AFZZ	J	AC	Tip Solid Induction,200mA
L458	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L500	RCILC0344AFZZ	J	AC	47 µH,Choke
L601,602	RCILC0372AFZZ	J	AC	22 µH,Choke
L603	RCILC0358AFZZ	J	AC	47 µH,Choke
L604	RCILC0372AFZZ	J	AC	22 µH,Choke
L608,609	RCILC0356AFZZ	J	AC	10 µH
L702,703	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L704	RCILC0352AFZZ	J	AB	Tip Impeder,150mA
L711	RCILC0352AFZZ	J	AB	Tip Impeder,150mA
L712~714	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L805	RCILZ0027AWZZ	J	AD	100 MHz,Tip Impeder
L807	RCILC0353AFZZ	J	AB	Tip Solid Induction,100mA
L821	RCILC0020AWZZ	J	AE	10 µH,Choke
L841	RCILC0019AWZZ	J	AF	22 µH,Choke
L851	RCILC0020AWZZ	J	AE	10 µH,Choke
VIBRATORS				
XL201	RCRSC0028AFZZ	J	AH	Crystal,33.8688 MHz
XL301	RCRSC0005AWZZ	J	AP	Crystal,12 MHz
XL401	RCRM-0042AWZZ	J	AF	Ceramic,8 MHz
CAPACITORS				
C100	VCSAFP0JJ106M	J	AE	10 µF,6.3V,Electrolytic,Tantalum
C102,103	VCKYCY0JB105K	J	AC	1 µF,6.3V
C106	VCKYCY0JB105K	J	AC	1 µF,6.3V
C107	VCKYCZ1CB333K	J	AB	0.033 µF,16V
C108,109	VCKYCY0JB105K	J	AC	1 µF,6.3V
C110	VCKYCY1AB224K	J	AB	0.22 µF,10V
C111	VCKYCY0JB105K	J	AC	1 µF,6.3V
C112	VCKYCZ1CB333K	J	AB	0.033 µF,16V
C113	VCKYCY0JB105K	J	AC	1 µF,6.3V
C114	VCCCCZ1HH5R0C	J	AB	5 pF (CH),50V
C121,122	VCKYCZ1HB221K	J	AB	220 pF,50V
C123,124	VCKYCZ1HB331K	J	AB	330 pF,50V
C130,131	VCKYCY1CB104K	J	AB	0.1 µF,16V
C132,133	VCKYCY1AB224K	J	AB	0.22 µF,10V
C165	VCKYCZ1CB273K	J	AC	0.027 µF,16V
C171,172	VCSAFA0JJ336M	J	AE	33 µF,6.3V,Electrolytic,Tantalum
C201	VCSAPR0JJ106M	J	AD	10 µF,6.3V,Electrolytic,Tantalum
C202	VCSATK0JJ476M	J	AD	47 µF,6.3V,Electrolytic,Tantalum
C203	VCKYCY1CB104K	J	AB	0.1 µF,16V
C204	VCKYCY0JB105K	J	AC	1 µF,6.3V
C205	VCKYCY1CB104K	J	AB	0.1 µF,16V
C207	VCKYCY1CB104K	J	AB	0.1 µF,16V
C209	VCKYCY1CB104K	J	AB	0.1 µF,16V
C211	VCCCCZ1HH5R0C	J	AB	5 pF (CH),50V
C212	VCCCCZ1HH8R0D	J	AB	8 pF (CH),50V
C250	VCEAPW0GW227M	J	AD	220 µF,4.0V,Electrolytic
C251,252	VCKYCY1CB104K	J	AB	0.1 µF,16V
C253	VCKYCZ1CB103K	J	AB	0.01 µF,16V
C270	VCKYCY0JB105K	J	AC	1 µF,6.3V
C272~274	VCKYCY1CB104K	J	AB	0.1 µF,16V
C301	VCKYCY0JB105K	J	AC	1 µF,6.3V
C302~306	VCKYCY0JB105K	J	AC	1 µF,6.3V
C307	VCCCCZ1HH330J	J	AB	33 pF (CH),50V
C309	VCKYCY0JB105K	J	AC	1 µF,6.3V
C312	VCKYCY0JB105K	J	AC	1 µF,6.3V

NO.	PART CODE	★	PRICE RANK	DESCRIPTION
C313,314	VCCCCZ1HH150J	J	AA	15 pF (CH),50V
C316	VCKYCZ1HB221K	J	AB	220 pF,50V
C351	VCCCCY1HH470J	J	AA	47 pF (CH),50V
C353	VCKYCY0JB105K	J	AC	1 µF,6.3V
C357	VCKYCY1CB104K	J	AB	0.1 µF,16V
C361	VCKYTV1HB393K	J	AB	0.039 µF,50V
C401	VCKYCY1CB104K	J	AB	0.1 µF,16V
C402	VCSAFP0JJ106M	J	AE	10 µF,6.3V,Electrolytic,Tantalum
C404	VCKYCY1CB104K	J	AB	0.1 µF,16V
C431	VCKYCY1AB474K	J	AC	0.47 µF,10V
C452	VCKYCY1CB104K	J	AB	0.1 µF,16V
C453	VCCCCZ1HH330J	J	AB	33 pF (CH),50V
C454	VCKYCZ1HB222K	J	AB	0.0022 µF,50V
C491	VCKYCY1CB104K	J	AB	0.1 µF,16V
C492	VCKYCY0JB105K	J	AC	1 µF,6.3V
C493	VCKYCY0JB105K	J	AC	1 µF,6.3V
C500	VCKYCY0JB105K	J	AC	1 µF,6.3V
C501,502	VCKYCZ1HB222K	J	AB	0.0022 µF,50V
C503	VCSAPR1AJ335M	J	AD	3.3 µF,10V,Electrolytic,Tantalum
C509,510	VCKYCY0JB105K	J	AC	1 µF,6.3V
C553	VCKYCZ1CB103K	J	AB	0.01 µF,16V
C600	RC-SZ0001AWZZ	J	AG	22 µF,6.3V,Electrolytic
C601~604	VCKYCY0JB105K	J	AC	1 µF,6.3V
C605	VCKYCY1CB104K	J	AB	0.1 µF,16V
C608,609	VCKYCY0JB105K	J	AC	1 µF,6.3V
C652	VCKYCY1CB104K	J	AB	0.1 µF,16V
C701,702	VCSAPR0JJ106M	J	AD	10 µF,6.3V,Electrolytic,Tantalum
C703	VCKYCZ1CB103K	J	AB	0.01 µF,16V
C704	VCKYCZ1HB471K	J	AA	470 pF,50V
C711,712	VCCCCZ1HH101J	J	AB	100 pF (CH),50V
C713,714	VCKYCY0JB105K	J	AC	1 µF,6.3V
C715	VCKYCY1CB104K	J	AB	0.1 µF,16V
C721,722	VCSAPR1AJ335M	J	AD	3.3 µF,10V,Electrolytic,Tantalum
C723,724	VCKYCZ1HB102K	J	AB	0.001 µF,50V
C725,726	VCSAPR1AJ335M	J	AD	3.3 µF,10V,Electrolytic,Tantalum
C731	VCKYCY1CB104K	J	AB	0.1 µF,16V
C733,734	VCKYCY1CB104K	J	AB	0.1 µF,16V
C753,754	VCKYCY0JB105K	J	AC	1 µF,6.3V
C758	VCKYCY0JB105K	J	AC	1 µF,6.3V
C760	VCKYCY1CB104K	J	AB	0.1 µF,16V
C763,764	VCKYCY0JB105K	J	AC	1 µF,6.3V
C765,766	VCKYCY1AB224K	J	AB	0.22 µF,10V
C771	VCSATE0JJ476M	J	AD	47 µF,6.3V,Electrolytic,Tantalum
C773	VCKYCY1AB224K	J	AB	0.22 µF,10V
C774~776	VCKYCY0JB105K	J	AC	1 µF,6.3V
C801	VCKYCZ1HB102K	J	AB	0.001 µF,50V
C802	VCKYCZ1AB104K	J	AB	0.1 µF,10V
C817	VCKYCZ1AB104K	J	AB	0.1 µF,10V
C821	VCKYTV1AB105K	J	AD	1 µF,10V
C822	RC-SZ0001AWZZ	J	AG	22 µF,6.3V,Electrolytic
C823	RC-EZ1715AFZZ	J	AE	47 µF,4V,Electrolytic
C826	VCCCCZ1HH121J	J	AB	120 pF (CH),50V
C827	VCCCCZ1EH151J	J	AB	150 pF (CH),50V
C830	VCKYCY0JB105K	J	AC	1 µF,6.3V
C831,832	VCKYCY1AB334K	J	AC	0.33 µF,10V
C838,839	VCKYCY0JB105K	J	AC	1 µF,6.3V
C840	VCKYCY1AB474K	J	AC	0.47 µF,10V
C841	VCKYCY0JB105K	J	AC	1 µF,6.3V
C842	RC-SZ0001AWZZ	J	AG	22 µF,6.3V,Electrolytic
C843~845	VCKYCY0JB105K	J	AC	1 µF,6.3V
C846	VCKYCZ1AB104K	J	AB	0.1 µF,10V
C847,848	VCKYCY0JB105K	J	AC	1 µF,6.3V
C850	VCKYCY0JB105K	J	AC	1 µF,6.3V
C851	VCKYTV1AB105K	J	AD	1 µF,10V
C852	RC-SZ0001AWZZ	J	AG	22 µF,6.3V,Electrolytic
C856	VCCCCZ1EH151J	J	AB	150 pF (CH),50V
C857	VCCCCZ1HH560J	J	AB	56 pF (CH),50V
C858	VCKYCY0JB105K	J	AC	1 µF,6.3V
C862,863	VCKYCY0JB105K	J	AC	1 µF,6.3V
C869	VCSATE0JJ476M	J	AD	47 µF,6.3V,Electrolytic,Tantalum
C870	VCKYCZ1CB103K	J	AB	0.01 µF,16V
C871	VCKYCZ1AB104K	J	AB	0.1 µF,10V
C876	VCKYCY0JB105K	J	AC	1 µF,6.3V
C890	VCKYCZ1AB104K	J	AB	0.1 µF,10V
C891~893	VCKYCY0JB105K	J	AC	1 µF,6.3V
C894	VCKYCZ1HB102K	J	AB	0.001 µF,50V
C901	VCKYCY0JB105K	J	AC	1 µF,6.3V
C902	VCKYCZ1CB103K	J	AB	0.01 µF,16V
C905~907	VCKYCZ1HB222K	J	AB	0.0022 µF,50V
C908	VCKYCY1AB334K	J	AC	0.33 µF,10V
C909,910	VCKYCZ1CB273K	J	AC	0.027 µF,16V
C911,912	VCKYCZ1AB104K	J	AB	0.1 µF,10V

NO.	PARTS CODE	★	PRICE RANK	DESCRIPTION
C913	VCKYCY0JB105K	J	AC	1 µF,6.3V
CA01,02	VCKYCY1CB104K	J	AB	0.1 µF,16V

RESISTORS

	VRS-CY1JB000J	J	AA	0 ohm,Jumper,0.8×1.55mm,Green
	VRS-CZ1JB000J	J	AB	0 ohm,Jumper,0.5×1.0mm
	VRS-TV2AB000J	J	AA	0 ohm,Jumper,1.25×2mm,Green
L491	VRS-TV2AB330J	J	AA	33 ohms,1/10W
R101~104	VRS-CZ1JB223J	J	AB	22 kohms,1/16W
R111	VRS-CZ1JB123J	J	AB	12 kohms,1/16W
R112	VRS-CZ1JB224J	J	AA	220 kohms,1/16W
R131	VRS-CZ1JB154D	J	AA	150 kohms,1/16W
R132	VRS-CZ1JB105D	J	AA	1 Mohm,1/16W
R133	VRS-CZ1JB154D	J	AA	150 kohms,1/16W
R134	VRS-CZ1JB105D	J	AA	1 Mohm,1/16W
R135	VRS-CZ1JB563D	J	AA	56 kohms,1/16W
R136	VRS-CZ1JB394D	J	AA	390 kohms,1/16W
R137	VRS-CZ1JB563D	J	AA	56 kohms,1/16W
R138	VRS-CZ1JB394D	J	AA	390 kohms,1/16W
R139	VRS-CZ1JB393J	J	AB	39 kohms,1/16W
R140	VRS-CZ1JB394J	J	AA	390 kohms,1/16W
R161	VRS-CZ1JB152J	J	AB	1.5 kohms,1/16W
R162	VRS-CZ1JB183J	J	AA	18 kohms,1/16W
R163,164	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R165	VRS-CZ1JB123J	J	AB	12 kohms,1/16W
R200	VRS-CZ1JB220J	J	AB	22 ohms,1/16W
R204	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R205	VRS-CZ1JB273D	J	AA	27 kohms,1/16W
R206	VRS-CZ1JB104D	J	AA	100 kohm,1/16W
R207	VRS-CZ1JB681J	J	AB	680 ohms,1/16W
R222	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R251	VRS-CZ1JB220J	J	AB	22 ohms,1/16W
R252	VRS-CZ1JB564J	J	AA	560 kohms,1/16W
R253	VRS-CZ1JB333J	J	AB	33 kohms,1/16W
R254	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R255	VRS-CZ1JB564J	J	AA	560 kohms,1/16W
R256	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R257	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R258	VRS-CZ1JB334J	J	AA	330 kohms,1/16W
R259	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R261	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R262	VRS-CZ1JB334J	J	AA	330 kohms,1/16W
R263	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R264	VRS-CZ1JB101J	J	AB	100 ohm,1/16W
R266	VRS-CZ1JB155J	J	AA	1.5 Mohms,1/16W
R271,272	VRS-CZ1JB474D	J	AA	470 kohms,1/16W
R273	VRS-CZ1JB393D	J	AA	39 kohms,1/16W
R274	VRS-CZ1JB683D	J	AA	68 kohms,1/16W
R275	VRS-CZ1JB153D	J	AA	15 kohms,1/16W
R276	VRS-CZ1JB154D	J	AA	150 kohms,1/16W
R277	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R278	VRS-CZ1JB220J	J	AB	22 ohms,1/16W
R281	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R282	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R305	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R307	VRS-CZ1JB474J	J	AB	470 kohms,1/16W
R311	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R312	VRS-CZ1JB272J	J	AB	2.7 kohms,1/16W
R313	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R314	VRS-CG1JF104J	J	AC	100 kohm,1/16W
R315	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R339,340	VRS-CZ1JB270J	J	AA	27 ohms,1/16W
R342	VRS-CZ1JB152J	J	AB	1.5 kohms,1/16W
R361	VRS-TV2AB150J	J	AA	15 ohms,1/10W
R402	VRS-CZ1JB223D	J	AB	22 kohms,1/16W
R403	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R404	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R405	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R406	VRS-CZ1JB223J	J	AB	22 kohms,1/16W
R407,408	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R411	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R412	VRS-CZ1JB153J	J	AA	15 kohms,1/16W
R414~416	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R421	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R423	VRS-CZ1JB223D	J	AB	22 kohms,1/16W
R425	VRS-CZ1JB223J	J	AB	22 kohms,1/16W
R431	VRS-CZ1JB334J	J	AA	330 kohms,1/16W
R442	VRS-CZ1JB471J	J	AA	470 ohms,1/16W
R443	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R444	VRS-CZ1JB471J	J	AA	470 ohms,1/16W
R445	VRS-CZ1JB103J	J	AA	10 kohm,1/16W

NO.	PART CODE	★	PRICE RANK	DESCRIPTION
R446	VRS-CZ1JB821J	J	AA	820 ohms,1/16W
R447	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R451	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R452	VRS-CZ1JB563J	J	AA	56 kohms,1/16W
R453,454	VRS-CZ1JB104D	J	AA	100 kohm,1/16W
R455	VRS-CZ1JB273J	J	AA	27 kohms,1/16W
R456	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R458	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R461	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R462	VRS-CZ1JB223J	J	AB	22 kohms,1/16W
R463	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R464	VRS-CZ1JB274J	J	AB	270 kohms,1/16W
R492	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R495	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R501,502	VRS-CZ1JB471J	J	AA	470 ohms,1/16W
R507,508	VRS-CZ1JB471J	J	AA	470 ohms,1/16W
R511,512	VRS-CZ1JB471J	J	AA	470 ohms,1/16W
R701,702	VRS-CZ1JB101J	J	AB	100 ohm,1/16W
R703	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R704	VRS-CG1JF223J	J	AC	22 kohms,1/16W
R710	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R711,712	VRS-CZ1JB562J	J	AB	5.6 kohms,1/16W
R713,714	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R715,716	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R719,720	VRS-CZ1JB822J	J	AA	8.2 kohms,1/16W
R721	VRS-CZ1JB330J	J	AA	33 ohms,1/16W
R723,724	VRS-CZ1JB682J	J	AB	6.8 kohms,1/16W
R725	VRS-CZ1JB101J	J	AB	100 ohm,1/16W
R726	VRS-CZ1JB393J	J	AB	39 kohms,1/16W
R727	VRS-CZ1JB153J	J	AA	15 kohms,1/16W
R728	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R729,730	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R731	VRS-CG1JF473J	J	AC	47 kohms,1/16W
R754	VRS-CZ1JB184J	J	AB	180 kohms,1/16W
R757	VRS-CZ1JB272J	J	AB	2.7 kohms,1/16W
R758	VRS-CZ1JB101J	J	AB	100 ohm,1/16W
R761	VRS-CZ1JB394J	J	AA	390 kohms,1/16W
R762	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R765,766	VRS-CZ1JB150J	J	AB	15 ohms,1/16W
R800	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R801	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R802	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R803	VRS-CZ1JB101J	J	AB	100 ohm,1/16W
R804	VRS-CZ1JB334J	J	AA	330 kohms,1/16W
R805	VRS-CZ1JB105J	J	AB	1 Mohm,1/16W
R806,807	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R808	VRS-CZ1JB564J	J	AA	560 kohms,1/16W
R809	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R810	VRS-CZ1JB223J	J	AB	22 kohms,1/16W
R812	VRS-CZ1JB474J	J	AB	470 kohms,1/16W
R813	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R814	VRS-CZ1JB273J	J	AA	27 kohms,1/16W
R815	VRS-CZ1JB474J	J	AB	470 kohms,1/16W
R816,817	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R818	VRS-CZ1JB473J	J	AA	47 kohms,1/16W
R819	VRS-CZ1JB472J	J	AB	4.7 kohms,1/16W
R821	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R822	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R823	VRS-CZ1JB274J	J	AB	270 kohms,1/16W
R824	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R825	VRS-CZ1JB274D	J	AK	270 kohms,1/16W
R827	VRS-CZ1JB274D	J	AK	270 kohms,1/16W
R828	VRS-CZ1JB222J	J	AB	2.2 kohms,1/16W
R829	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R831	VRS-CZ1JB184D	J	AB	180 kohms,1/16W
R832	VRS-CZ1JB154D	J	AA	150 kohms,1/16W
R834	VRS-CZ1JB824D	J	AB	820 kohms,1/16W
R836	VRS-CZ1JB184D	J	AB	180 kohms,1/16W
R837	VRS-CZ1JB154D	J	AA	150 kohms,1/16W
R838	VRS-CZ1JB105D	J	AA	1 Mohm,1/16W
R841	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R842	VRS-CZ1JB100J	J	AB	10 ohm,1/16W
R850	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R853	VRS-CZ1JB274J	J	AB	270 kohms,1/16W
R854	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R855	VRS-CZ1JB224D	J	AA	220 kohms,1/16W
R856	VRS-CZ1JB155J	J	AA	1.5 Mohms,1/16W
R857	VRS-CZ1JB564D	J	AA	560 kohms,1/16W
R870	VRS-CZ1JB684J	J	AB	680 kohms,1/16W
R871	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R881	VRS-CZ1JB183J	J	AA	18 kohms,1/16W
R882	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R884,885	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R886	VRS-CZ1JB562J	J	AB	5.6 kohms,1/16W
R887~889	VRS-CZ1JB102J	J	AB	1 kohm,1/16W
R890	VRS-CZ1JB124J	J	AB	120 kohms,1/16W
R904	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R905	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R906	VRS-CZ1JB274J	J	AB	270 kohms,1/16W
R907	VRS-CZ1JB124J	J	AB	120 kohms,1/16W
R908	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
R909	VRS-CZ1JB103J	J	AA	10 kohm,1/16W
R920	VRS-CZ1JB104J	J	AA	100 kohm,1/16W
RA01	VRS-CY1JB152J	J	AA	1.5 kohms,1/16W
RA02	VRS-CY1JB222J	J	AA	2.2 kohms,1/16W
RA03	VRS-CY1JB332J	J	AA	3.3 kohms,1/16W
RA04	VRS-CY1JB682J	J	AA	6.8 kohms,1/16W
RA05	VRS-CY1JB123J	J	AA	12 kohms,1/16W
RA06	VRS-CY1JB333J	J	AA	33 kohms,1/16W

OTHER CIRCUITRY PARTS

	CN101	QCNCW046XAWZZ	J	AM	Socket,22Pin
	CN451	QCNCW862PAFZZ	J	AG	Socket,14Pin
	CN601	QCNCW862LAFZZ	J	AF	Socket,11Pin
	CNA01	QCNCW047GAWZZ	J	AF	Socket,7Pin
⚠	F301	QFS-L631AAWNZ	J	AE	Square Tip Type Fuse,630mA
	FPC01	————		—	Flexible PWB (PWB-B)
	J701	VHLGP1FD202-1	J	AT	Jack,Optical/Line
	J702	QJAKM0018AWZZ	J	AG	Jack,Mic In
	J703	QJAKM0015AWZZ	J	AL	Jack,Remote Control/Headphones
	J801	QJAKC0008AWZZ	J	AE	Jack,DC IN
	JK301	QJAKZ0017AWZZ	J	AH	Jack,USB
	M901	RMOTV0044AWZZ	J	AW	Motor Ass'y [Spindle]
	M902	RMOTS0002AWZZ	J	AT	Motor Ass'y [Sled]
	M903	RMOTV0033AWZZ	J	AW	Motor Ass'y [Lift]
	SW401	QSW-M0010AWZZ	J	AE	Switch,Key Type [Eject]
	SW402	QSW-M0010AWZZ	J	AE	Switch,Key Type [Open/Close]
	SW901	QSW-M0013AWZZ	J	AF	Switch,Push Type [Disc Protect]
	SWA01	QSW-K0237AFZZ	J	AC	Switch,Key Type [Record]
	SWA02	QSW-K0237AFZZ	J	AC	Switch,Key Type [Play]
	SWA03	QSW-K0237AFZZ	J	AC	Switch,Key Type [Stop]
	SWA04	QSW-K0237AFZZ	J	AC	Switch,Key Type [Skip Up]
	SWA05	QSW-K0237AFZZ	J	AC	Switch,Key Type [Skip Down]
	SWA06	QSW-K0237AFZZ	J	AC	Switch,Key Type [Volume +]
	SWA07	QSW-K0237AFZZ	J	AC	Switch,Key Type [Volume -]
	SWA08	QSW-K0237AFZZ	J	AC	Switch,Key Type [Mode]
	SWA09	QSW-K0237AFZZ	J	AC	Switch,Key Type [Synchronised Recording]

MD MECHANISM PARTS

	1	LANGK0211AWZZ	J	AC	Shaft Guide
	2	LANGK0283AWZZ	J	AD	Pickup Guide
	3	LCHSM0134AWM1	J	AN	Chassis Ass'y
	4	LHLDX3013AWM1	J	AL	Cartridge Holder Ass'y
	5	MLEVF0084AWFW	J	AD	Lever,Lift Link
	6	MLEVF0085AWFW	J	AC	Lever,Lift Move
	7	MLEVF0086AWFW	J	AD	Lever,Lift
	8	MLEVF0087AWFW	J	AC	Lever,Eject Protect
	9	MSPRP0060AWFJ	J	AB	Spring,Thrust
	10	MSPRP0067AWFJ	J	AB	Spring,Grip Rack
	11	MSPRT0058AWFJ	J	AB	Spring,Eject Lever
	12	MSPRT0059AWFJ	J	AB	Spring,Cancel Lever
	13	NBRGC0004AWZZ	J	AB	Metal
	14	NGERH0096AWZZ	J	AC	Gear,Drive
	15	NGERH0125AWZZ	J	AB	Wheel,Drive
	16	NSFTD0011AWZZ	J	AG	Shaft,Drive Screw
	17	QPWBH0018AWZZ	J	AH	Mechanism Flexible PWB
	18	RCILH0003AWM1	J	AT	Magnetic Head Unit
⚠	19	92LHPM280	J	BT	Optical Pickup Unit
	501	LX-BZ0049AWZZ	J	AB	Screw,ø1.4×1.8mm
	502	LX-BZ0050AWZZ	J	AB	Screw,ø1.4×2.5mm
	503	LX-BZ0051AWZZ	J	AB	Screw,ø1.4×3.8mm
	504	LX-BZ0059AWZZ	J	AB	Screw,ø1.4×1.8mm
	505	LX-BZ0079AWZZ	J	AB	Screw,ø1.4×1.2mm
	506	LX-BZ0823AFZZ	J	AA	Screw,ø1.4×1.2mm
	507	LX-BZ0979AFZZ	J	AB	Screw,ø1.4×1.8mm
	508	LX-WZ9290AFZZ	J	AA	Washer,ø0.8×ø2.4×0.2mm
	M901	RMOTV0044AWZZ	J	AW	Motor,Ass'y [Spindle]
	M902	RMOTS0002AWZZ	J	AT	Motor,Ass'y [Sled]
	M903	RMOTV0033AWZZ	J	AW	Motor,Ass'y [Lift]

CABINET PARTS

NO.	PART CODE	★	PRICE RANK	DESCRIPTION
201	GCAB-1212AWSA	J	AP	Cabinet,Side
202	GCAB-1213AWSA	J	AU	Cabinet,Center
203	GCABA3020AWM1	J	AY	Cabinet,Top
204	GCABB3020AWSA	J	AT	Cabinet,Bottom [H]
204	GCABB3021AWSA	J		Cabinet,Bottom [W]
205	GCOVH1032AWZZ	J	AD	Cover,Terminal
206	GCOVH1316AWZZ	J	AC	Cover,Eject Frame
207	GCOVH8001AWSA	J	AE	Cover,USB Terminal
208	GFTAB1037AWSA	J	AF	Cover,Battery
209	HDECQ0828AWSA	J	AX	Decoration Plate
210	JKNBZ0840AWSA	J	AG	Operation Button,A
211	JKNBZ0841AWSC	J	AK	Operation Button,B
212	JKNBZ0842AWSA	J	AE	Knob,Eject
213	JKNBZ0843AWSA	J	AC	Rec Button
214	LANGZ0051AWM1	J	AH	Bracket,Battery Lid Ass'y [+]
215	LHLDJ1001AWSA	J	AD	Holder,USB Terminal
216	LHLDZ1376AWZZ	J	AD	Holder,LCD
217	LHLDZ1377AWZZ	J	AD	Holder,Terminal
218	LHLDZ1378AWZZ	J	AD	Holder,Battery Terminal [-]
219	LHLDZ3024AWM1	J	AK	Eject Frame Ass'y
220	LHLDZ3025AWM1	J	AQ	Main Frame Ass'y
221	LPINZ0053AWZZ	J	AC	Pin,Switch Lever
222	MLEVP0117AWZZ	J	AC	Lever,Switch
223	MSPRP0066AWFQ	J	AG	Spring,Battery Terminal [-]
224	PGUMS0020AWZZ	J	AB	Rubber,Battery
225	PSHET0069AWZZ	J	AD	Sheet,PWB
226	PSHET0077AWZZ	J	AB	Sheet,Battery Terminal
227	PSHET0079AWZZ	J	AB	Sheet,Pickup
228	PSHET0080AWZZ	J	AB	Sheet,Jack
229	PSHET0081AWZZ	J	AB	Sheet,Battery Terminal [+]
230	PSHET0090AWZZ	J	AB	Sheet,Operation Button,A
231	PSHET0092AWZZ	J	AB	Sheet,Operation Button,B
232	PSHET0093AWZZ	J	AD	Sheet,Insulation
233	PSHET0100AWZZ	J	AA	Sheet,Headphones Jack
234	PSHEZ0130AWZZ	J	AC	Sheet,Decoration Plate
235	PSHEZ0131AWZZ	J	AD	Tape,Operation Button,A
236	PSHEZ0132AWZZ	J	AB	Tape,Operation Button,B
237	QTANB9040AWFQ	J	AC	Terminal,Extension
238	RUNTZ0038AWZZ	J	AZ	LCD Ass'y
239	TCAUS0053AWZZ	J	AB	Label,Class 3B
240	PSHEZ0158AWZZ	J	AC	Tape,Decoration Plate
241	TLABF0001AWZZ	J		Label,DMC [For Korea]
601	LX-BZ0047AWFC	J	AB	Screw,ø1.4×1.5mm
602	LX-BZ0048AWFN	J	AC	Screw,ø1.4×2.5mm
603	LX-CZ0016AWFN	J	AB	Screw,ø1.4×2.5mm
604	LX-CZ0017AWFC	J	AB	Screw,ø1.4×6mm

ACCESSORIES/PACKING PARTS (IM-MT899W)

	GCASZ0002AWSA	J	AL	Battery Case
	PSHET0083AWZZ	J	AB	Sheet,Guide
	QCNWG0043AWZZ	J	AY	USB Cord
	QCNWG0382AFZZ	J	AK	Connecting Cord,RCA Type
	QCNWG0422AFZZ	J	AQ	Optical Cable
⚠	RADPA5050AWZZ	J	BG	AC Adaptor [For Hong Kong]
⚠	RADPA5051AWZZ	J	BF	AC Adaptor [Except for Australia/ Newzealand/Thailand/Hong Kong]
⚠	RADPA5052AWZZ	J	BF	AC Adaptor [For Thailand]
⚠	RADPA6049AWZZ	J	BF	AC Adaptor [For Australia/Newzealand]
	RPHOH0004AWZZ	J	AQ	Earphones
	RRMCW0017AWSA	J	BP	Remote Contorol
	RUNTZ0045AWM1	J	BF	Battery Charger
	SPAKA0385AWZZ	J		Packing Add.
	SPAKC1480AWZZ	J		Packing Case
	SPAKZ0678AWZZ	J	AE	Pad,AC Adaptor
	SSAKA0009AWZZ	J	AA	Bag,Polyethylene
	TCAUH0086AWZZ	J		Caution Card,Open MG
	TCAUZ0143AWZZ	J		Card,License Form
	TINSZ0826AWZZ	J		Operation Manual
	TINSZ0829AWZZ	J		Operation Manual,Software
	TLABG0002AWZZ	J	AB	Label,Hong Kong
	TLABN0092AW02	J	AB	Label SER.No. ,Packing Case
	TLABN0209AW08	J		Label SER.No. [For Hong Kong]
	TLABN0209AW09	J		Label SER.No. [Except for Australia/Newzealand/Thailand]
	TLABN0209AW10	J		Label SER.No. [For Australia/Newzealand]
	TLABN0209AW11	J		Label SER.No. [For Thailand]
	TLABS0294AWZZ	J	AB	Label,CPA
	TLABZ0600AWSA	J	AC	Label,COUNTRY OF ORIGIN
	TLABZ0618AWZZ	J	AB	Label,M.I.M
	TLABZ0695AWZZ	J	AA	Label,Caution
	UBAGC0007AWSA	J	AG	Carrying Bag
	UBAGC0009AWSA	J	AD	Battery Carrying Case
	UBATM0009AWSA	J	AY	Rechargeable Nickel-Metal Hydride Battery
	UDSKA0002AWZZ	J	AQ	Software CD ROM
	92LGCARD1266E1	J	AC	Warranty Card [For Australia/ Newzealand]

ACCESSORIES/PACKING PARTS (IM-MT899H)

1	GCASZ0002AWSA	J	AL	Battery Case
2	PSHET0083AWZZ	J	AB	Sheet,Guide
3	QCNWG0043AWZZ	J	AY	USB Cord
4	QCNWG0382AFZZ	J	AK	Connecting Cord,RCA Type
5	QCNWG0422AFZZ	J	AQ	Optical Cable
6	————		—	AC Adaptor [For Korea]
⚠ 6	RADPA7057AWZZ	J	AX	AC Adaptor [Except for U.K.]
⚠ 6	RADPA8058AWZZ	J	AY	AC Adaptor [For U.K.]
7	RPHOH0004AWZZ	J	AQ	Earphones
8	RRMCW0017AWSA	J	BP	Remote Contorol
9	RUNTZ0045AWM1	J	BF	Battery Charger
10	SPAKA0385AWZZ	J		Packing Add.
11	SPAKC1479AWZZ	J		Packing Case
12	————		—	Operation Manual [For Korea]
12	TINSE0457AWZZ	J		Operation Manual [For U.K.]
12	TINSZ0824AWZZ	J	AQ	Operation Manual [Except for U.K.]
13	SPAKZ0699AWZZ	J	AD	Pad,AC Adaptor
14	SSAKA0009AWZZ	J	AA	Bag,Polyethylene
15	TCADS0005AWZZ	J	AB	Service Card [For U.K.Only]
16	TCAUH0085AWZZ	J		Caution Card,Open MG
17	TCAUZ0136AWZZ	J		Card,License Form
18	TGANE0013AWZZ	J	AC	Warranty/Registration Card [For U.K.]
19	TINSE0458AWZZ	J		Quick Guide [For U.K.Only]
20	————		—	Operation Manual,Software [For Korea]
20	TINSE0460AWZZ	J		Operation Manual,Software [For U.K.]
20	TINSZ0827AWZZ	J	AM	Operation Manual,Software [Except for U.K.]
21	TLABN0092AWZZ	J	AB	Label SER.No.,Packing Case [For U.K.]
21	TLABN0092AW02	J	AB	Label SER.No. ,Packing Case [Except for U.K.]
22	TLABN0209AW04	J		Label SER.No. [Except for U.K.]
22	TLABN0209AW06	J		Label SER.No. [For U.K.]
22	TLABN0209AW07	J		Label SER.No. [For Korea]
23	TLABZ0695AWZZ	J	AA	Label,Caution
24	UBAGC0007AWSA	J	AG	Carrying Bag
25	UBAGC0009AWSA	J	AD	Battery Carrying Case
26	UBATM0009AWSA	J	AY	Rechargeable Nickel-Metal Hydride Battery
27	UDSKA0002AWZZ	J	AQ	Software CD ROM
28	SPAKZ0490AWZZ	J	AC	Pad,Operation Manual [For U.K./Korea]
29	TCAUZ0144AWZZ	J		User Support Caution
30	TSPC-0787AWZZ	J	AC	Label,Specification [For Thailand Only]

P.W.B. ASSEMBLY (Not Replacement Item)

PWB-A	92LPWB4663MDSS	J		Main
PWB-B	92LPWB3873KEYS	J	BE	LCD/KEY

OTHER SERVICE PARTS

QCNWN6936AFZZ	J	AU	Performance Test (Extension Cable for Motors)
RUNTK0613AFZZ	J	AV	Performance Test (Extension Relay PWB for Motors)
UDSKM0001AFZZ	J	AZ	Recording Mini Disc
88GMMD-110	J	BV	High Reflection Disc MMD-110 (TEAC Test MD)
88GMMD-213A	J	BT	Low Reflection Disc MMD-213A (TEAC Test MD)

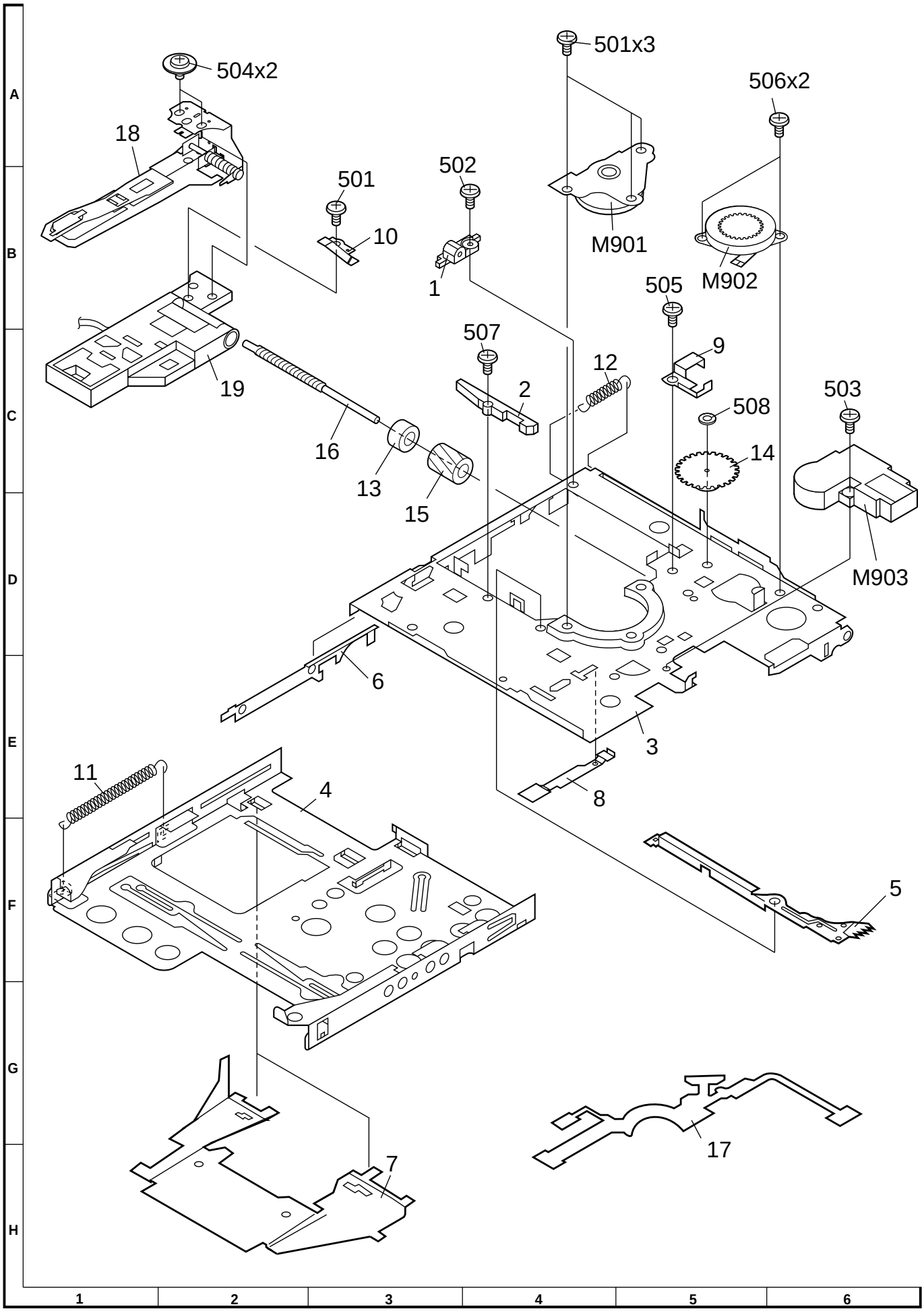


Figure 5 MD MECHANISM EXPLODED VIEW

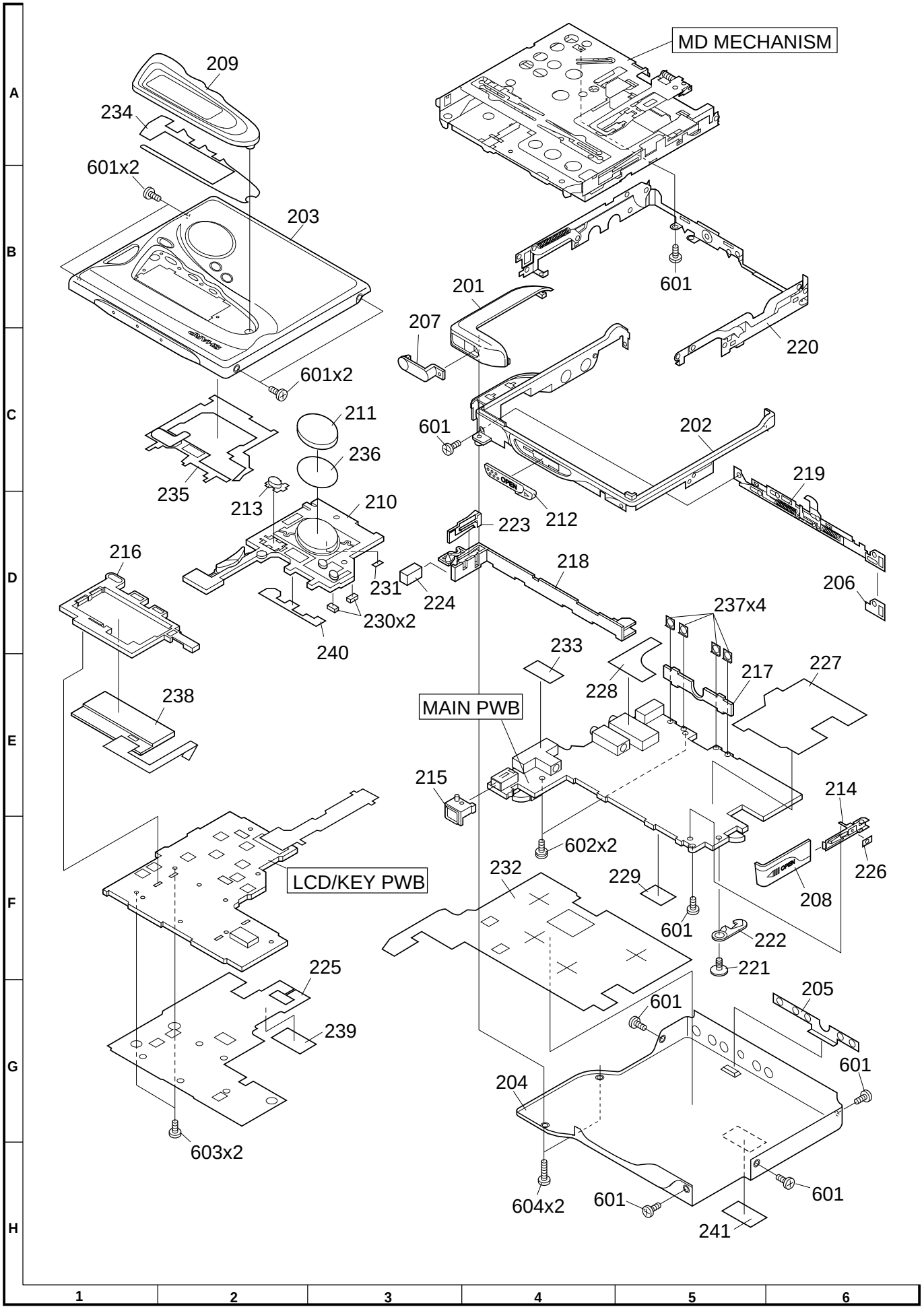
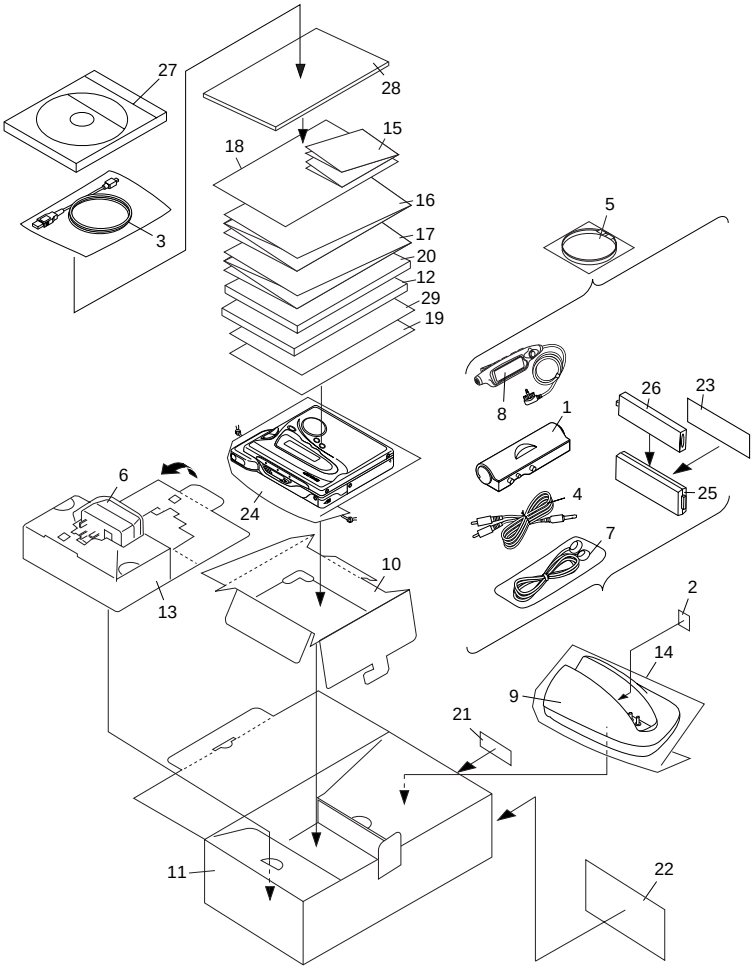


Figure 6 CABINET EXPLODED VIEW

PACKING METHOD (FOR U.K. ONLY)

Setting position of switches and knobs		
Remote Control	HOLD	CANCEL

1	GCASZ0002AWSA	Battery Case
2	PSHET0083AWZZ	Sheet, Guide
3	QCNWG0043AWZZ	USB Cord
4	QCNWG0382AFZZ	Connecting Cord, RCA Type
5	QCNWG0422AFZZ	Optical Cable
6	RADPA8058AWZZ	AC Adaptor
7	RPHOH0004AWZZ	Earphones
8	RRMCW0017AWSA	Remote Control
9	RUNTZ0045AWM1	Battery Charger
10	SPAKA0385AWZZ	Packing Add.
11	SPAKC1479AWZZ	Packing Case
12	TiNSE0457AWZZ	Operation Manual
13	SPAKZ0699AWZZ	Pad, AC Adaptor
14	SSAKA0009AWZZ	Bag, Polyethylene
15	TCADS0005AWZZ	Service Card
16	TCAUH0085AWZZ	Caution Card, Open MG
17	TCAUZ0136AWZZ	Card, License Form
18	TGANE0013AWZZ	Warranty/Registration Card
19	TiNSE0458AWZZ	Quick Guide
20	TiNSE0460AWZZ	Operation Manual, Software
21	TLABN0092AWZZ	Label, SER. No.,Packing Case
22	TLABN0209AW06	Label, SER. No.
23	TLABZ0695AWZZ	Label, Caution
24	UBAGC0007AWSA	Carrying Bag
25	UBAGC0009AWSA	Battery Carrying Case
26	UBATM0009AWSA	Rechargeable Nickel-Metal Hydride Battery
27	UDSKA0002AWZZ	Software CD ROM
28	SPAKZ0490AWZZ	Pad, Operation Manual
29	TCAUZ0144AWZZ	User Support Caution



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